

CE Test Report

Product Name : Bluetooth 5.1 BLE Data Module
Trade Name : Laird Connectivity
Model No. : BL653

Applicant : Laird Connectivity, Inc.
Address : W66N220 Commerce Court, Cedarburg,
Wisconsin 53012, USA

Date of Receipt : Mar. 02, 2020
Issued Date : Jun. 17, 2020
Report No. : 2030001R-RFCEP01V00
Report Version : V3.0



The test results relate only to the samples tested.

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Test Report Certification

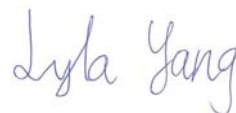
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Product Name : Bluetooth 5.1 BLE Data Module
Applicant : Laird Connectivity, Inc.
Address : W66N220 Commerce Court, Cedarburg, Wisconsin 53012,
USA
Manufacturer : Laird Connectivity, Inc.
Model No. : BL653
EUT Voltage : DC 3.3V
Testing Voltage : DC 3.3V
Trade Name : Laird Connectivity
Applicable Standard : ETSI EN 300 328 V2.2.2 (2019-07)
Laboratory Name : Hsin Chu Laboratory
Address : No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township,
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TEL: +886-3-582-8001 / FAX: +886-3-582-8958
Test Result : Complied

Documented By :



(Lyla Yang / Engineering Adm. Specialist)

Tested By :



(Elwin Lin / Engineer)

Approved By :



(Louis Hsu / Deputy Manager)

Revision History

Report No.	Version	Description	Issued Date
2030001R-RFCEP01V00	V1.0	Initial issue of report.	Jun. 02, 2020
2030001R-RFCEP01V00	V2.0	1. Revise Product Name 2. Added description to chapter 1.1.	Jun. 16, 2020
2030001R-RFCEP01V00	V3.0	1. Revise description to chapter 1.1, Note 1.	Jun. 17, 2020

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1. General Information

1.1. EUT Description

Product Name	Bluetooth 5.1 BLE Data Module
Trade Name	Laird Connectivity
Model No.	BL653
Frequency Range/Channel Number	2402~2480MHz / 40 Channels
Type of Modulation	GFSK
BLE PHY	125kbps 、 500kbps 、 1Mbps 、 2Mbps

Note: The 1Mbps and 2Mbps are the worst case data rates for BLE PHY.

Antenna Information			
Manufacturer	Model No.	Antenna Type	Antenna Gain
Mag.Layers	EDA-8709-2G4C1-B27-CY	External Dipole Antenna	2400-2500MHz: 2dBi
Laird	NanoBlue	External PCB Antenna	2400-2500MHz: 2dBi
Laird	FlexPIFA	External PCB Antenna	2400-2480MHz: 2dBi
Laird	mFlexPIFA	External PIFA Antenna	2400-2480MHz: 2dBi
Laird	BL653_Printed PCB Antenna	Internal PCB Antenna	2400-2500MHz: 1.28dBi

Note: The maximum antenna gain between external PCB antennas of NanoBlue and FlexPIFA was selected to perform for all tests, and the worst result is recorded in this report.

EUT Operational Condition			
Power Supply Type	Vnom (DC 3.3V)		
Operational Climatic	Tnom (25°C)	Tmax (105°C)	Tmin (-40°C)

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00	2402 MHz	Channel 10	2422 MHz	Channel 20	2442 MHz	Channel 30	2462 MHz
Channel 01	2404 MHz	Channel 11	2424 MHz	Channel 21	2444 MHz	Channel 31	2464 MHz
Channel 02	2406 MHz	Channel 12	2426 MHz	Channel 22	2446 MHz	Channel 32	2466 MHz
Channel 03	2408 MHz	Channel 13	2428 MHz	Channel 23	2448 MHz	Channel 33	2468 MHz
Channel 04	2410 MHz	Channel 14	2430 MHz	Channel 24	2450 MHz	Channel 34	2470 MHz
Channel 05	2412 MHz	Channel 15	2432 MHz	Channel 25	2452 MHz	Channel 35	2472 MHz
Channel 06	2414 MHz	Channel 16	2434 MHz	Channel 26	2454 MHz	Channel 36	2474 MHz
Channel 07	2416MHz	Channel 17	2436 MHz	Channel 27	2456 MHz	Channel 37	2476 MHz
Channel 08	2418 MHz	Channel 18	2438 MHz	Channel 28	2458 MHz	Channel 38	2478 MHz
Channel 09	2420 MHz	Channel 19	2440 MHz	Channel 29	2460 MHz	Channel 39	2480 MHz

Note:

1. This device is Bluetooth 5.1 BLE Data Module supports BT 5.0 (125kbps, 500kbps, 1Mbps and 2Mbps) transmitting and receiving function. The power setting is supports High power (8dBm) and Low power (-40dBm).
2. The EUT description is from the customer declaration.

1.2. Test Mode

DEKRA has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode	Mode 1: Transmit Mode_External Dipole Ant._High Power Mode 2: Transmit mode_External Dipole Ant._Low Power Mode 3: Transmit mode_External PCB Ant. Mode 4: Transmit mode_External PIFA Ant. Mode 5: Transmit mode_Internal PCB Ant. Mode 6: Receive Mode_External Dipole Ant. Mode 7: Receive Mode_External PCB Ant. Mode 8: Receive Mode_External PIFA Ant. Mode 9: Receive Mode_Internal PCB Ant. Mode 10: Normal Mode_High Power Mode 11: Normal Mode_Low Power
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Test Items	Modulation	Channel	Antenna	Result
Output power	GFSK	00/19/39	0	Complies
Maximum spectral power density	GFSK	00/19/39	0	Complies
Transmitter unwanted emissions in the out-of-band domain	GFSK	00/39	0	Complies
Occupied Channel Bandwidth	GFSK	00/39	0	Complies
Transmitter spurious emission	GFSK	00/39	0	Complies
Receiver spurious emission	GFSK	00/39	0	Complies
Adaptivity	The RF Output Power Level of this equipment is less than +10 dBm EIRP, so this item does not need to be tested. Not applicable.			
Receiver Blocking	GFSK	00/39	0	Complies

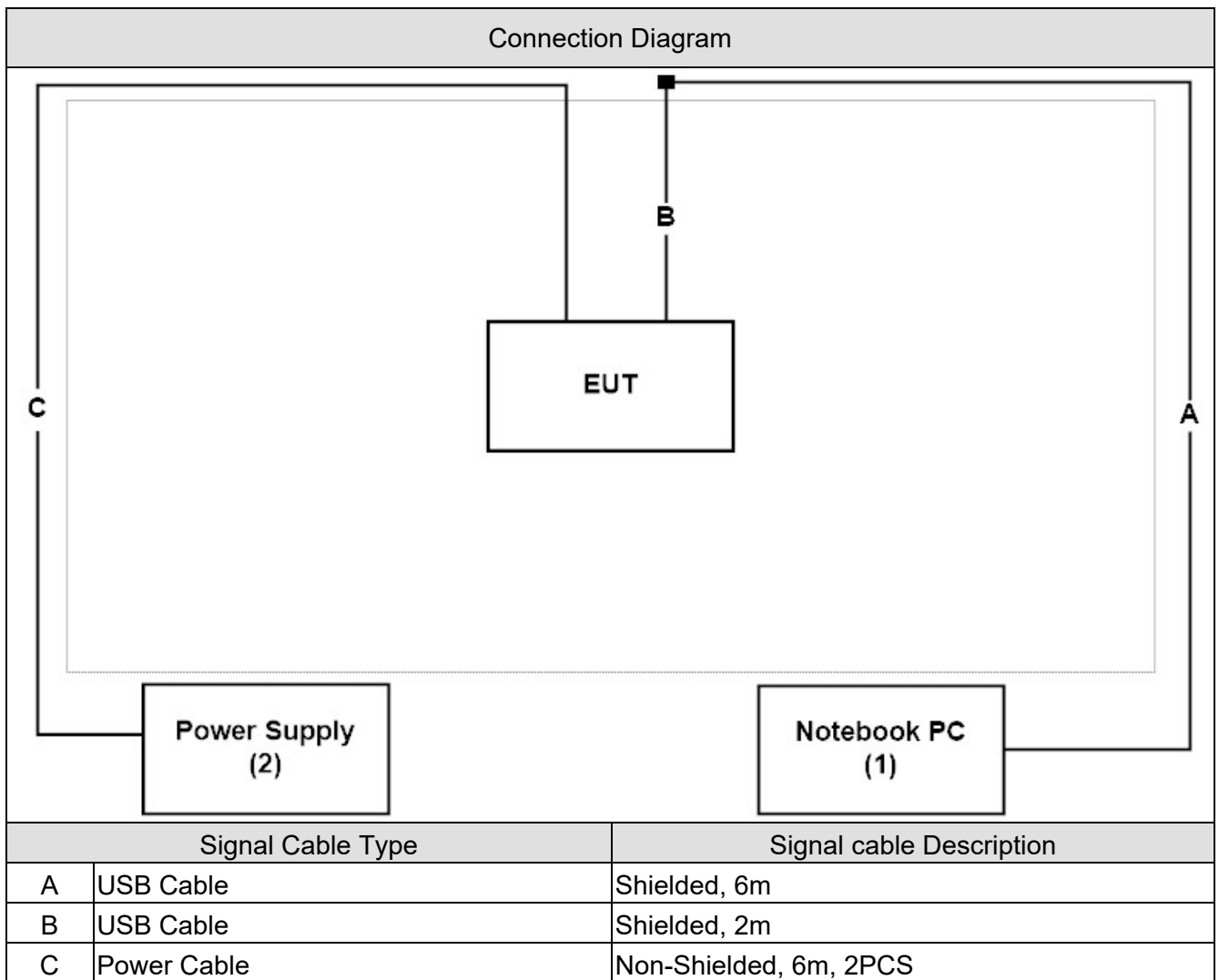
Note: Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 Notebook PC	Dell	E6320	4035578082	Non-Shielded, 1.8m
2 DC Power Supply	Topward	6030D	809508	Non-Shielded, 1.8m

1.4. Configuration of tested System



1.5. EUT Exercise Software

1	Setup the EUT as shown in Section 1.4.
2	Turn on the EUT power.
3	Execute software "BleDtmRfTool" and set relevant parameters.
4	Confirm that the signal sent is correct.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required	Test Site
Temperature (°C)	ETSI EN 300 328	15 - 35	3
Humidity (%RH)	Output power	20 - 75	
Temperature (°C)	ETSI EN 300 328	15 - 35	3
Humidity (%RH)	Maximum spectral power density	20 - 75	
Temperature (°C)	ETSI EN 300 328	15 - 35	3
Humidity (%RH)	Transmitter unwanted emission in the out-of-band domain	20 - 75	
Temperature (°C)	ETSI EN 300 328	15 - 35	3
Humidity (%RH)	Occupied Channel Bandwidth	20 - 75	
Temperature (°C)	ETSI EN 300 328	15 - 35	2
Humidity (%RH)	Transmitter Spurious Emissions	20 - 75	
Temperature (°C)	ETSI EN 300 328	15 - 35	2
Humidity (%RH)	Receiver Spurious Emissions	20 - 75	
Temperature (°C)	ETSI EN 300 328	15 - 35	--
Humidity (%RH)	Adaptivity	20 - 75	
Temperature (°C)	ETSI EN 300 328	15 - 35	3
Humidity (%RH)	Receiver Blocking	20 - 75	

Note: Test Site information refers to Laboratory Information.

Laboratory Information

The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site: <http://www.dekra.com.tw>

If you have any comments, please don't hesitate to contact us. Our test sites as below:

Test Laboratory	DEKRA Testing and Certification Co., Ltd.
Address	1. No. 75-2, 3rd Lin, WangYe Keng, Yonghxing Tsuen, Qionglin Shiang, Hsinchu County 307, Taiwan, R.O.C. 2. No.372, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C. 3. No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C.
Phone number	1. +886-3-592-8858 2. +886-3-582-8001 3. +886-3-582-8001
Fax number	1. +886-3-592-8859 2. +886-3-582-8958 3. +886-3-582-8958
E mail address	info.tw@dekra.com
Website	http://www.dekra.com.tw

1.7. List of Test Equipment

RF output power / SR12-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Temperature & Humidity Test Chamber	KSON	THS-B4T-150	A0401	2020/01/06	2021/01/06
USB Power Sensor	Keysight	U2021XA	MY54110016	N/A	N/A
USB Power Sensor	Keysight	U2021XA	MY54070005	N/A	N/A
USB Power Sensor	Keysight	U2021XA	MY54080017	N/A	N/A
USB Power Sensor	Keysight	U2021XA	MY54120005	N/A	N/A
MIMO Power Switch Box	Pallas	4PS6A-1	TW5451093	N/A	N/A

Maximum spectral power density / SR12-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	US47140172	2019/06/28	2020/06/27
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2020/02/21	2021/02/20
Signal & Spectrum Analyzer	R&S	FSV40	101049	2020/03/30	2021/03/29
Signal Analyzer	R&S	FSV7	101650	2020/03/23	2021/03/22
Signal Analyzer	R&S	FSVA40	101455	2019/10/21	2020/10/20
Spectrum Analyzer	Keysight	N9030B	MY57140404	2019/06/18	2020/06/17

Transmitter unwanted emissions in the out-of-band domain / SR12-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	US47140172	2019/06/28	2020/06/27
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2020/02/21	2021/02/20
Signal & Spectrum Analyzer	R&S	FSV40	101049	2020/03/30	2021/03/29
Signal Analyzer	R&S	FSV7	101650	2020/03/23	2021/03/22
Signal Analyzer	R&S	FSVA40	101455	2019/10/21	2020/10/20
Spectrum Analyzer	Keysight	N9030B	MY57140404	2019/06/18	2020/06/17

Occupied Channel Bandwidth / SR12-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	US47140172	2019/06/28	2020/06/27
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2020/02/21	2021/02/20
Signal & Spectrum Analyzer	R&S	FSV40	101049	2020/03/30	2021/03/29
Signal Analyzer	R&S	FSV7	101650	2020/03/23	2021/03/22
Signal Analyzer	R&S	FSVA40	101455	2019/10/21	2020/10/20
Spectrum Analyzer	Keysight	N9030B	MY57140404	2019/06/18	2020/06/17

Transmitter unwanted emissions in the spurious domain / CB3-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	2019/10/21	2020/10/20
Signal & Spectrum Analyzer	R&S	FSV40	101049	2020/03/30	2021/03/29
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2020/02/21	2021/02/20
Bilog Antenna	Teseq	CBL6112D	23191	2019/06/17	2020/06/16
Horn Antenna	Schwarzbeck	BBHA 9120D	639	2019/05/28	2020/05/27
Horn Antenna	Schwarzbeck	BBHA 9170	202	2019/12/27	2020/12/26
Pre-Amplifier	EMCI	EMC003240	980324	2020/01/02	2021/01/01
Pre-Amplifier	EMCI	EMC0031835	980233	2019/12/20	2020/12/19
Pre-Amplifier	EMCI	EMC01820I	980364	2019/09/24	2020/09/23
Band Reject Filter	Micro-Tronics	BRM50702	G192	2020/03/09	2021/03/08
Coaxial Cable(19m)	Suhner	SF104	CB3_1	2019/07/25	2020/07/24
EMI system	DEKRA	Version 1.0	CB3-H	NA	NA

Receiver spurious emission / CB3-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	2019/10/21	2020/10/20
Signal & Spectrum Analyzer	R&S	FSV40	101049	2020/03/30	2021/03/29
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2020/02/21	2021/02/20
Bilog Antenna	Teseq	CBL6112D	23191	2019/06/17	2020/06/16
Horn Antenna	Schwarzbeck	BBHA 9120D	639	2019/05/28	2020/05/27
Horn Antenna	Schwarzbeck	BBHA 9170	202	2019/12/27	2020/12/26
Pre-Amplifier	EMCI	EMC003240	980324	2020/01/02	2021/01/01
Pre-Amplifier	EMCI	EMC0031835	980233	2019/12/20	2020/12/19
Pre-Amplifier	EMCI	EMC01820I	980364	2019/09/24	2020/09/23
Band Reject Filter	Micro-Tronics	BRM50702	G192	2020/03/09	2021/03/08
Coaxial Cable(19m)	Suhner	SF104	CB3_1	2019/07/25	2020/07/24
EMI system	DEKRA	Version 1.0	CB3-H	NA	NA

Receiver Blocking / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
ESG Vector Signal Generator	Agilent	E4438C	MY45095759	2019/05/21	2020/05/20
MXG Vector Signal Generator	Keysight	N5182B	MY53052548	2020/02/24	2021/02/23
Spectrum Analyzer	Agilent	N9010A	US47140172	2019/06/28	2020/06/27
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2020/02/21	2021/02/20
Signal & Spectrum Analyzer	R&S	FSV40	101049	2020/03/30	2021/03/29
Signal Analyzer	R&S	FSV7	101650	2020/03/23	2021/03/22
EXG Analog Signal Generator	Keysight	N5171B	MY56200665	2019/06/18	2020/06/17
Wideband Radio Communication Tester	R&S	CMW500	150246	2020/02/24	2021/02/23
Spectrum Analyzer	Keysight	N9030B	MY57140404	2019/06/18	2020/06/17

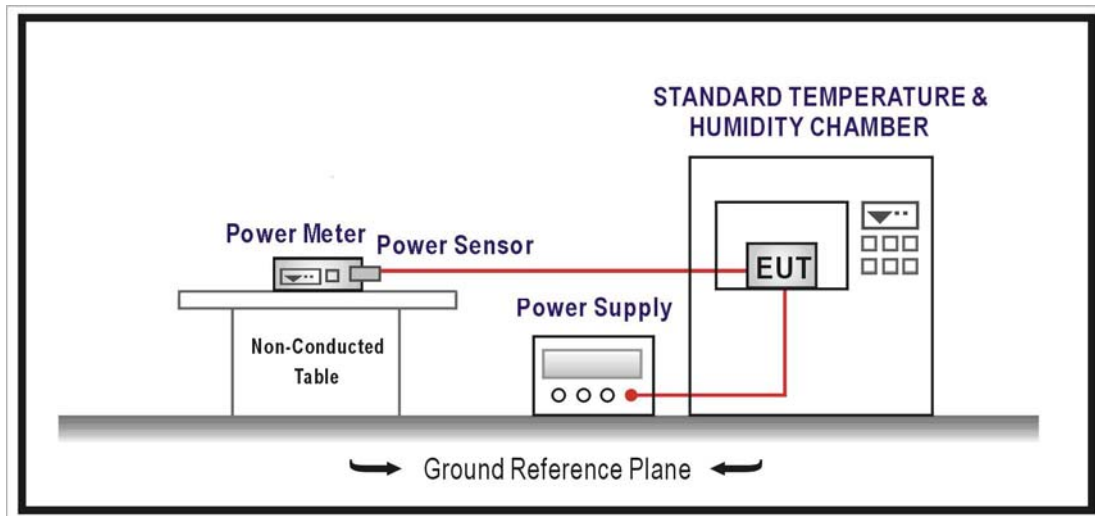
Note: All equipment upon which need to calibrated are with calibration period of 1 year.

1.8. Uncertainty

Test item	Uncertainty
RF output power	± 1.27 dB
Maximum spectral power density	± 1.27 dB
Transmitter unwanted emissions in the out-of-band domain	± 1.27 dB
Occupied Channel Bandwidth	± 150 Hz
Transmitter unwanted emissions in the spurious domain	± 3.9 dB above 1GHz ± 3.8 dB below 1GHz
Receiver spurious emission	± 3.9 dB above 1GHz ± 3.8 dB below 1GHz
Adaptivity	N/A
Receiver Blocking	N/A

2. RF Output power

2.1. Test Setup



2.2. Test Condition

The measurements for RF output power shall be performed at both normal environmental conditions and at the extremes of the operating temperature range.

2.3. Limits

For non-adaptive frequency systems

The maximum RF output power for non-adaptive equipment shall be declared by the supplier and shall not exceed 20 dBm.

For non-adaptive equipment using wide band modulations other than FHSS, the maximum RF output power shall be equal to or less than the value declared by the supplier.

This limit shall apply for any combination of power level and intended antenna assembly.

For adaptive frequency systems

For adaptive equipment using wide band modulations other than FHSS, the maximum RF output power shall be 20 dBm.

2.4. Test Procedure

Refer to ETSI EN 300 328 V2.2.2 (2019-07) Clause 5.4.2

2.5. Test Specification

According to ETSI EN 300 328 V2.2.2 (2019-07)

2.6. Test Result

Product	Bluetooth 5.1 BLE Data Module		
Test Item	RF Output power		
Test Mode	Mode 1: Transmit Mode_External Dipole Ant._High Power		
Date of Test	2020/04/07	Test Site	SR12-H
Temperature (°C)	21.0	Humidity (%RH)	60.0

GFSK, 1Mbps					
Detector: Average					
Modulation	Condition	Frequency (MHz)	Reading Level (dBm)	Measure Level (dBm)	Limit (dBm)
BLE	NTNV	2402	7.570	9.570	20
		2440	7.600	9.600	20
		2480	7.500	9.500	20
	HTNV	2402	6.870	8.870	20
		2440	6.860	8.860	20
		2480	6.750	8.750	20
	LTVN	2402	7.900	9.900	20
		2440	7.980	9.980	20
		2480	7.890	9.890	20

* Measure Level = Reading Level + Antenna Gain

GFSK, 2Mbps					
Detector: Average					
Modulation	Condition	Frequency (MHz)	Reading Level (dBm)	Measure Level (dBm)	Limit (dBm)
BLE	NTNV	2402	7.570	9.570	20
		2440	7.590	9.590	20
		2480	7.500	9.500	20
	HTNV	2402	6.850	8.850	20
		2440	6.840	8.840	20
		2480	6.730	8.730	20
	LTVN	2402	7.900	9.900	20
		2440	7.980	9.980	20
		2480	7.890	9.890	20

* Measure Level = Reading Level + Antenna Gain

Product	Bluetooth 5.1 BLE Data Module		
Test Item	RF Output power		
Test Mode	Mode 2: Transmit mode_External Dipole Ant._Low Power		
Date of Test	2020/04/10	Test Site	SR12-H
Temperature (°C)	22.0	Humidity (%RH)	59.0

GFSK, 1Mbps					
Detector: Average					
Modulation	Condition	Frequency (MHz)	Reading Level (dBm)	Measure Level (dBm)	Limit (dBm)
BLE	NTNV	2402	-42.560	-40.560	20
		2440	-42.710	-40.710	20
		2480	-43.600	-41.600	20
	HTNV	2402	-43.530	-41.530	20
		2440	-43.750	-41.750	20
		2480	-44.720	-42.720	20
	LTNV	2402	-41.640	-39.640	20
		2440	-41.540	-39.540	20
		2480	-42.230	-40.230	20

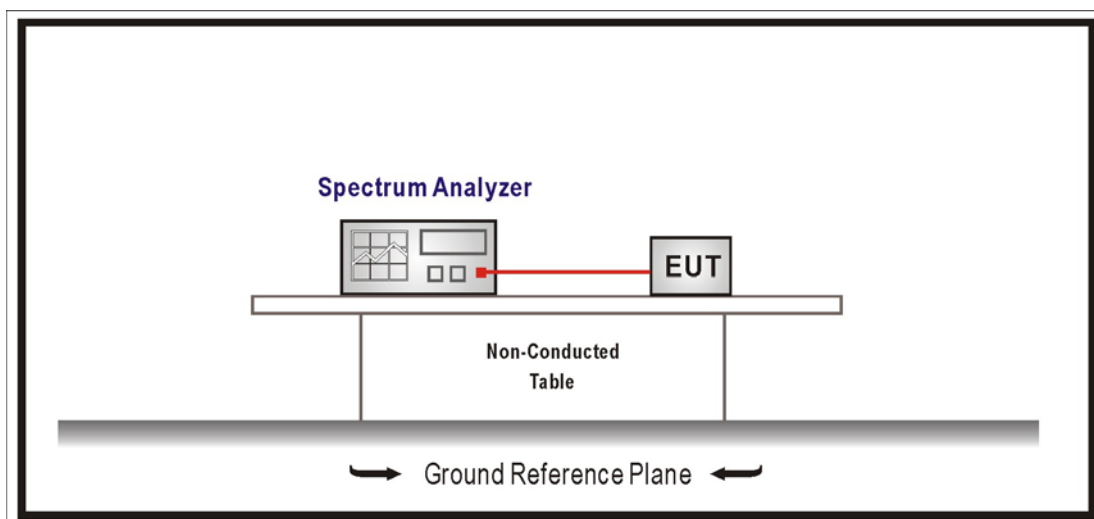
* Measure Level = Reading Level + Antenna Gain

GFSK, 2Mbps					
Detector: Average					
Modulation	Condition	Frequency (MHz)	Reading Level (dBm)	Measure Level (dBm)	Limit (dBm)
BLE	NTNV	2402	-41.000	-39.000	20
		2440	-41.040	-39.040	20
		2480	-42.220	-40.220	20
	HTNV	2402	-41.980	-39.980	20
		2440	-42.180	-40.180	20
		2480	-42.710	-40.710	20
	LTNV	2402	-39.830	-37.830	20
		2440	-40.150	-38.150	20
		2480	-40.860	-38.860	20

* Measure Level = Reading Level + Antenna Gain

3. Maximum spectral power density

3.1. Test Setup



3.2. Test Condition

These measurements shall only be performed at normal test conditions.

3.3. Limits

For equipment using wide band modulations other than FHSS, the maximum Power Spectral Density is limited to 10 dBm per MHz, including antenna gain.

3.4. Test Procedure

Refer to ETSI EN 300 328 V2.2.2 (2019-07) Clause 5.4.3

3.5. Test Specification

According to ETSI EN 300 328 V2.2.2 (2019-07)

3.6. Test Result

Product	Bluetooth 5.1 BLE Data Module		
Test Item	Maximum spectral power density		
Test Mode	Mode 1: Transmit Mode_ External Dipole Ant._ High Power		
Date of Test	2020/04/07	Test Site	SR12-H
Temperature (°C)	21.0	Humidity (%RH)	60.0

GFSK, 1Mbps			
Channel	Frequency (MHz)	Measure Level (dBm/MHz)	Limit (dBm/MHz)
00	2402	9.500	10
19	2440	9.520	10
39	2480	9.420	10

GFSK, 2Mbps			
Channel	Frequency (MHz)	Measure Level (dBm/MHz)	Limit (dBm/MHz)
00	2402	8.470	10
19	2440	8.480	10
39	2480	8.370	10

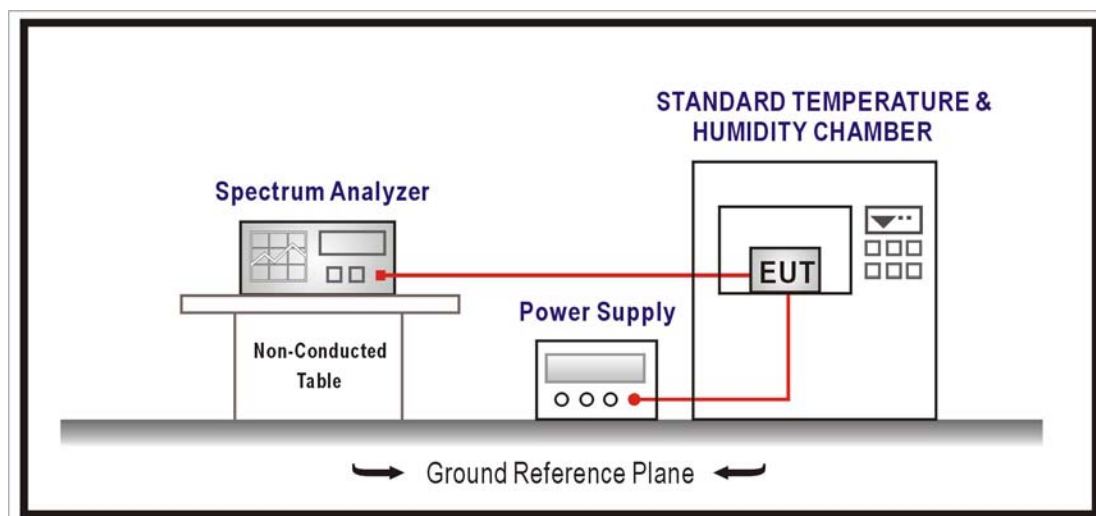
Product	Bluetooth 5.1 BLE Data Module		
Test Item	Maximum spectral power density		
Test Mode	Mode 2: Transmit mode_ External Dipole Ant._ Low Power		
Date of Test	2020/04/10	Test Site	SR12-H
Temperature (°C)	22.0	Humidity (%RH)	59.0

GFSK, 1Mbps			
Channel	Frequency (MHz)	Measure Level (dBm/MHz)	Limit (dBm/MHz)
00	2402	-40.640	10
19	2440	-40.800	10
39	2480	-41.690	10

GFSK, 2Mbps			
Channel	Frequency (MHz)	Measure Level (dBm/MHz)	Limit (dBm/MHz)
00	2402	-40.110	10
19	2440	-40.160	10
39	2480	-41.360	10

4. Transmitter unwanted emissions in the out-of-band domain

4.1. Test Setup



4.2. Test Condition

Normal test conditions and repeated at extreme of the operating temperature range.

4.3. Limits

The transmitter unwanted emissions in the out-of-band domain but outside the allocated band, shall not exceed the values provided by the mask in figure 3.

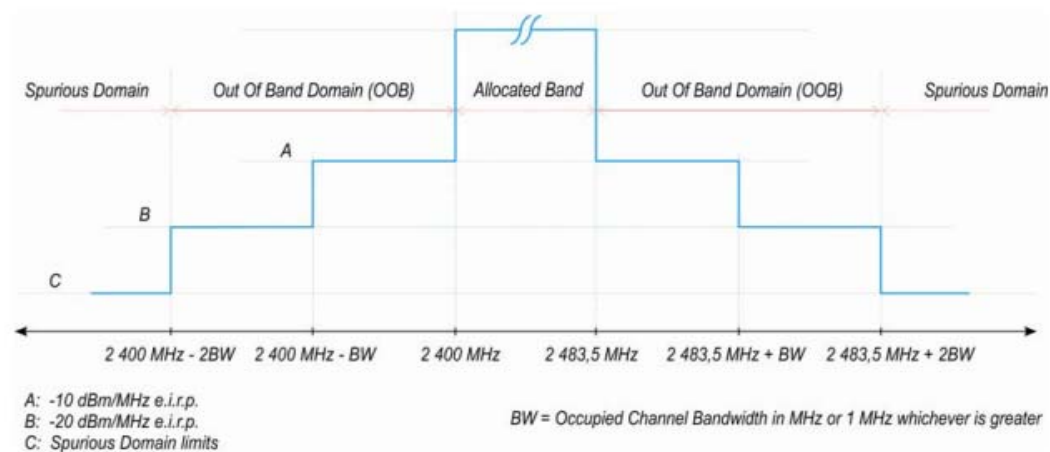


Figure 3: Transmit mask

4.4. Test Procedure

Refer to ETSI EN 300 328 V2.2.2 (2019-07) Clause 5.4.8

4.5. Test Specification

According to ETSI EN 300 328 V2.2.2 (2019-07)

4.6. Test Result

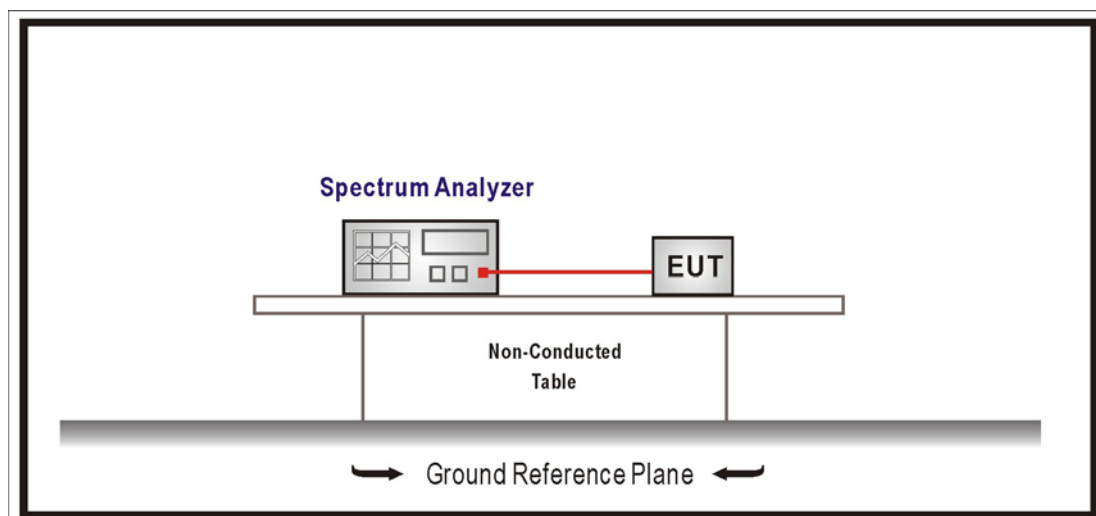
Product	Bluetooth 5.1 BLE Data Module		
Test Item	Transmitter unwanted emissions in the out-of-band domain		
Test Mode	Mode 1: Transmit Mode_ External Dipole Ant._ High Power		
Date of Test	2020/04/07	Test Site	SR12-H
Temperature (°C)	21.0	Humidity (%RH)	60.0

GFSK, 1Mbps						
Condition	Frequency (MHz)	Occupied Bandwidth (MHz)	Frequency (MHz)	Reading Value (dBm)	Measure Value (dBm)	Limit (dBm/MHz)
NTNV	2402	1.070	2397.860	-34.598	-32.598	-20
			2398.930	-21.533	-19.533	-10
			2484.570	-52.295	-50.295	-10
			2485.640	-52.198	-50.198	-20
	2480	1.076	2397.848	-51.713	-49.713	-20
			2398.924	-48.929	-46.929	-10
			2484.576	-35.333	-33.333	-10
			2485.652	-40.210	-38.210	-20

GFSK, 2Mbps						
Condition	Frequency (MHz)	Occupied Bandwidth (MHz)	Frequency (MHz)	Reading Value (dBm)	Measure Value (dBm)	Limit (dBm/MHz)
NTNV	2402	2.076	2395.849	-37.709	-35.709	-20
			2397.924	-13.437	-11.437	-10
			2485.576	-52.606	-50.606	-10
			2487.651	-52.882	-50.882	-20
	2480	2.081	2395.838	-52.558	-50.558	-20
			2397.919	-49.933	-47.933	-10
			2485.581	-34.518	-32.518	-10
			2487.662	-40.150	-38.150	-20

5. Occupied Channel Bandwidth

5.1. Test Setup



5.2. Test Condition

These measurements shall only be performed at normal test conditions.

5.3. Limits

The Occupied Channel Bandwidth shall fall completely within the band 2.4 GHz to 2.4835 GHz.

In addition, for non-adaptive equipment using wide band modulations other than FHSS and with e.i.r.p greater than 10 dBm, the occupied channel bandwidth shall be less than 20 MHz.

5.4. Test Procedures

Refer to ETSI EN 300 328 V2.2.2 (2019-07) Clause 5.4.7

5.5. Test Specification

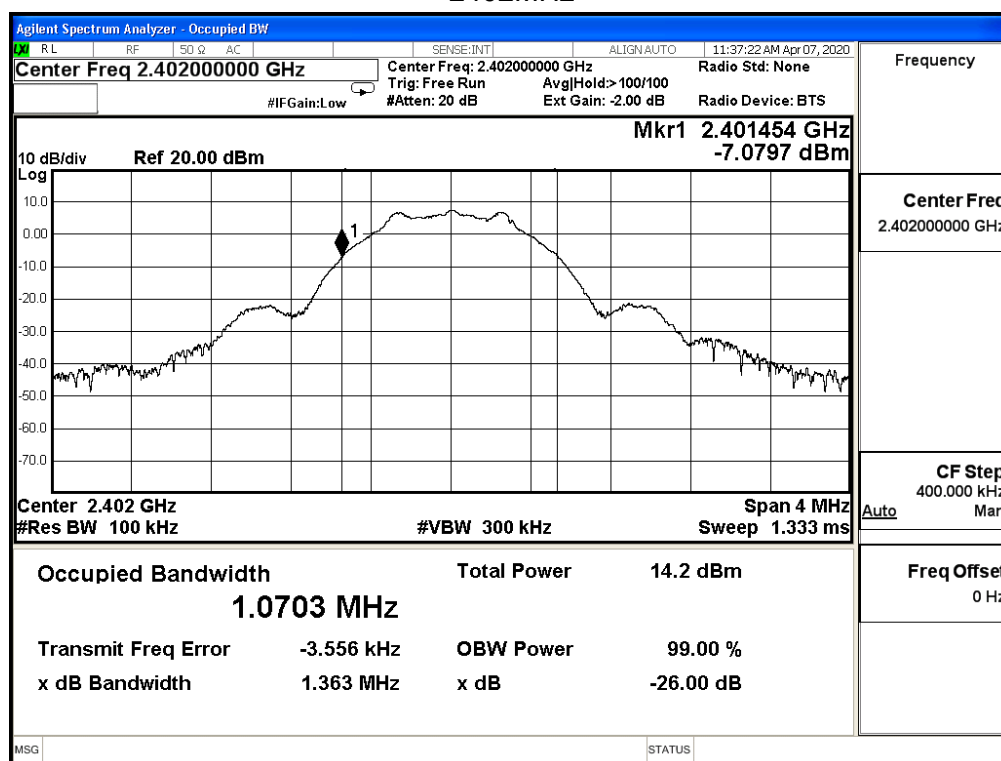
According to ETSI EN 300 328 V2.2.2 (2019-07)

5.6. Test Result

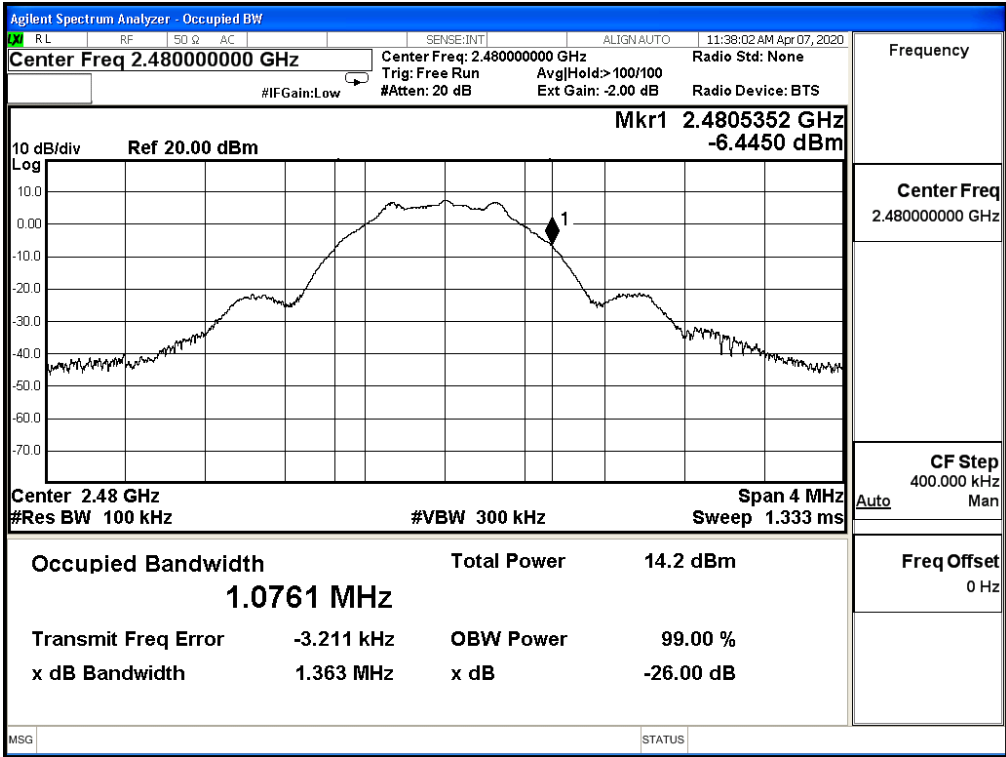
Product	Bluetooth 5.1 BLE Data Module		
Test Item	Occupied Channel Bandwidth		
Test Mode	Mode 1: Transmit Mode_External Dipole Ant._High Power		
Date of Test	2020/04/07	Test Site	SR12-H
Temperature (°C)	21.0	Humidity (%RH)	60.0

GFSK, 1Mbps				
Channel No.	Frequency (MHz)	Reading Value (MHz)	Measure Value (MHz)	Limit (MHz)
00	2402	1.070	2401.454	≥ 2400.000
39	2480	1.076	2480.535	≤ 2483.500

2402MHz



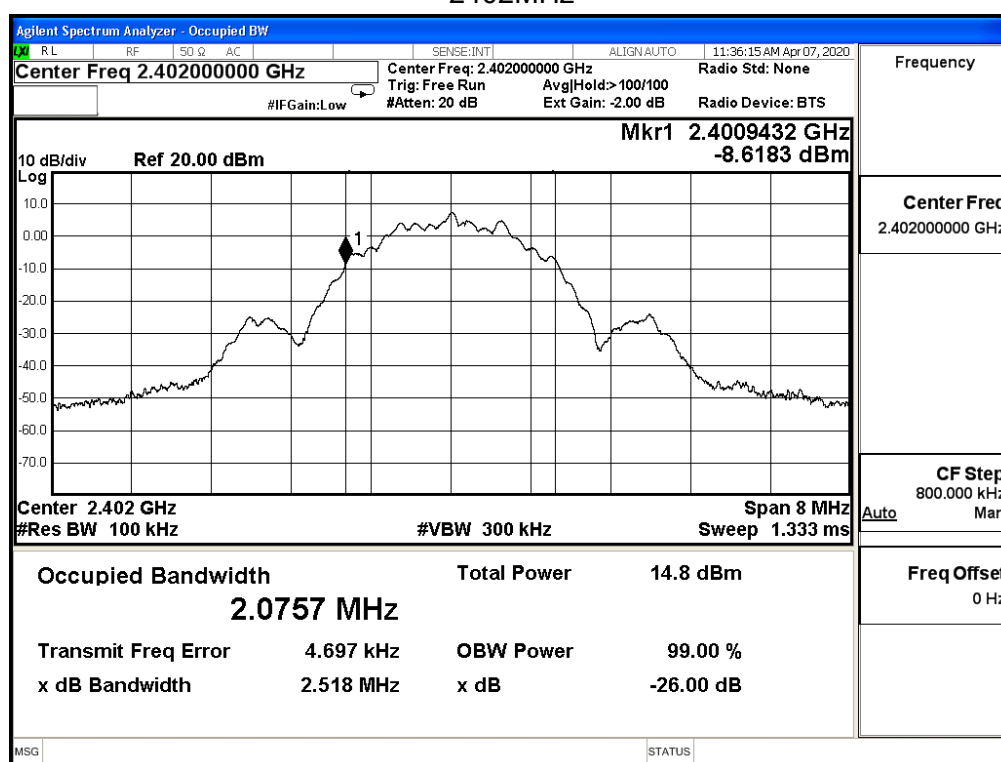
2480MHz



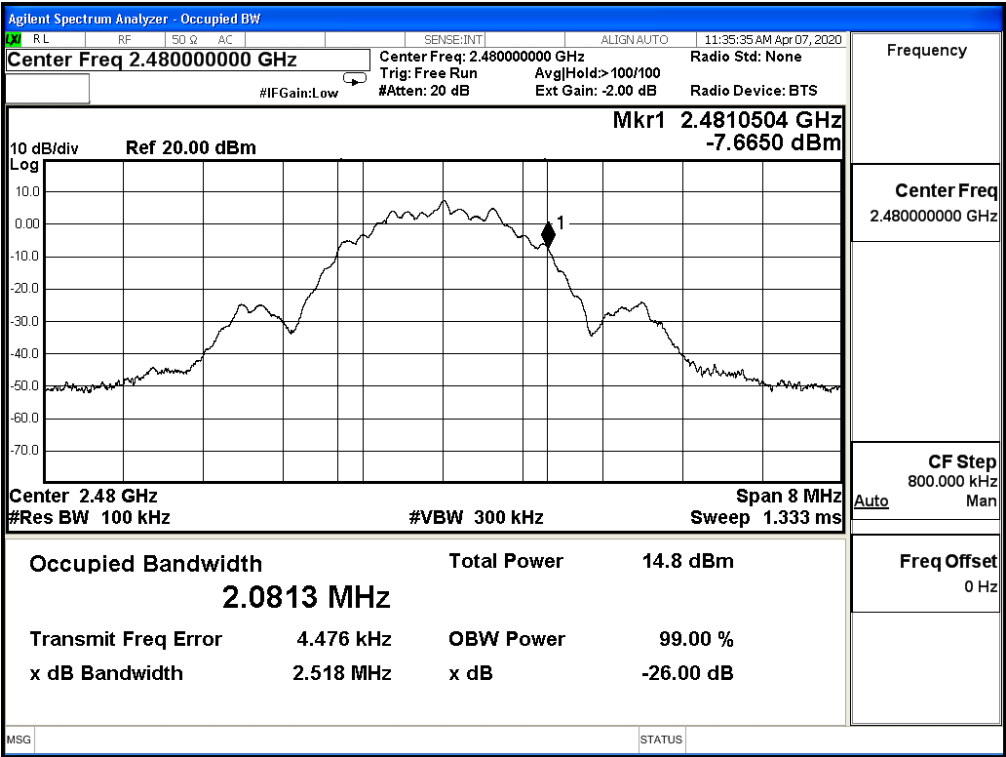
Product	Bluetooth 5.1 BLE Data Module		
Test Item	Occupied Channel Bandwidth		
Test Mode	Mode 1: Transmit Mode_ External Dipole Ant._ High Power		
Date of Test	2020/04/07	Test Site	SR12-H
Temperature (°C)	21.0	Humidity (%RH)	60.0

GFSK, 2Mbps				
Channel No.	Frequency (MHz)	Reading Value (MHz)	Measure Value (MHz)	Limit (MHz)
00	2402	2.076	2400.943	≥ 2400.000
39	2480	2.081	2481.050	≤ 2483.500

2402MHz



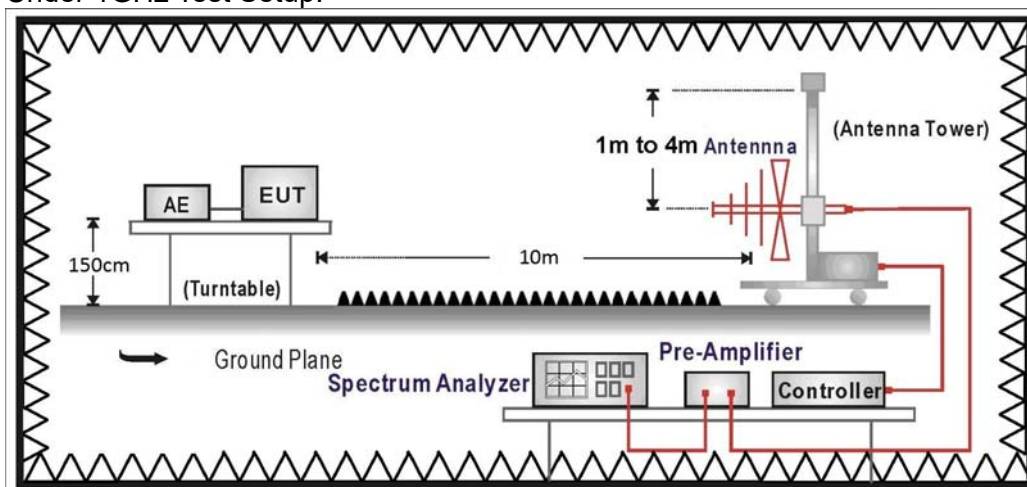
2480MHz



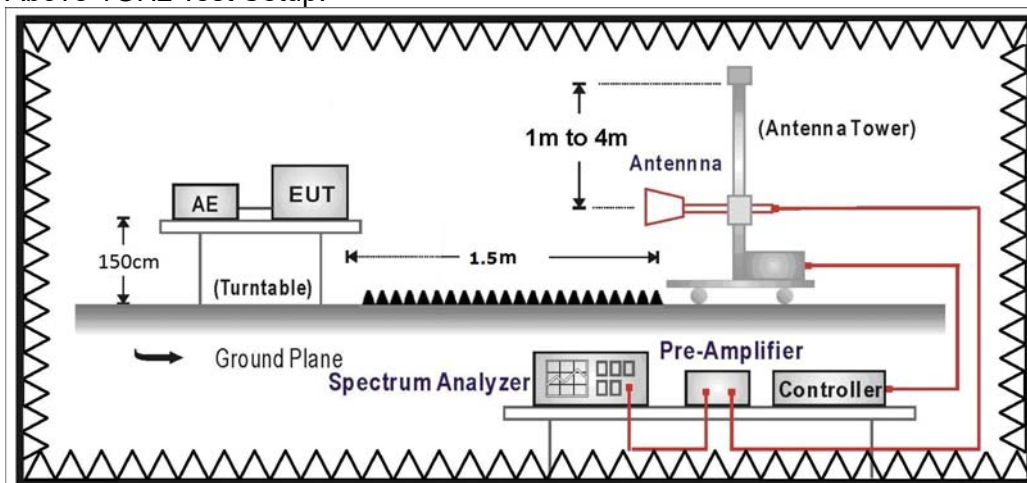
6. Transmitter unwanted emissions in the spurious domain

6.1. Test Setup

Under 1GHz Test Setup:



Above 1GHz Test Setup:



6.2. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

6.3. Limits

Frequency range	Maximum power	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 694 MHz	-54 dBm	100 kHz
694 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 12,75 GHz	-30 dBm	1 MHz

6.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 1.5 meters above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 10 or 1.5 meters. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Broadband antenna (calibrated bi-log and horn antenna) are used as a receiving antenna. Both horizontal and vertical polarization of the antenna are set on measurement. And a high frequency preamplifier were used increase the sensitivity of the measuring. In order to find the maximum emission, all of the interface cables must be manipulated according to ETSI EN 300 328 V2.2.2 (2019-07) on radiated measurement.

The additional notch filter below 1GHz was used to measure the level of harmonics radiated emission during field strength of harmonics measurement. The bandwidth below 1GHz setting on the field strength meter is 100 kHz, and 1MHz bandwidth is adpted above 1GHz. The frequency range from 30MHz to 12.75GHz is checked.

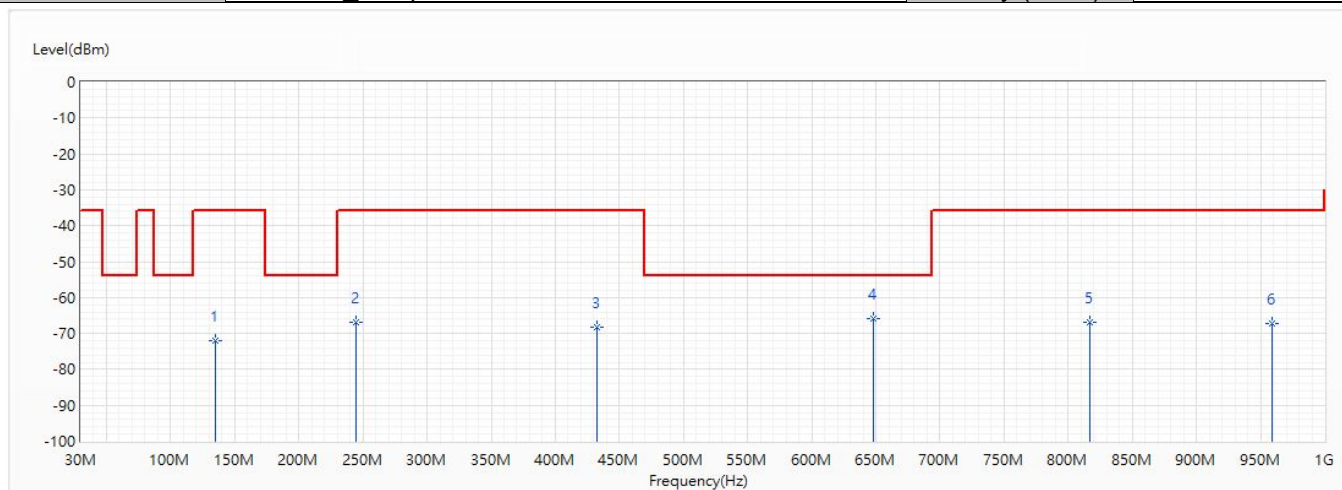
6.5. Test Specification

According to ETSI EN 300 328 V2.2.2 (2019-07)

6.6. Test Result

30 MHz-1GHz Spurious:

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/2
Test Mode	Mode 1: Transmit Mode_External Dipole Ant._High Power	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2440MHz_1Mbps	Humidity (%RH)	57.0

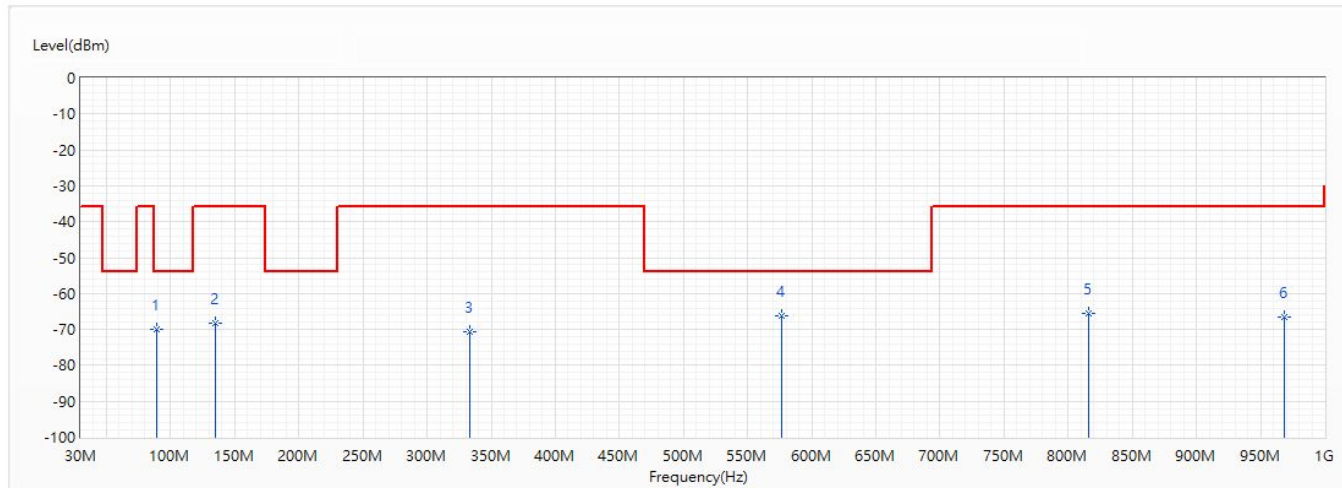


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	135.148	-71.87	-36.00	-35.87	-63.08	-8.79	PK
2	244.661	-67.00	-36.00	-31.00	-57.92	-9.08	PK
3	432.259	-68.40	-36.00	-32.40	-64.41	-3.99	PK
* 4	648.181	-65.78	-54.00	-11.78	-65.21	-0.57	PK
5	817.058	-66.74	-36.00	-30.74	-67.36	0.62	PK
6	958.775	-67.25	-36.00	-31.25	-68.44	1.19	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/2
Test Mode	Mode 1: Transmit Mode_External Dipole Ant._High Power	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2440MHz_1Mbps	Humidity (%RH)	57.0

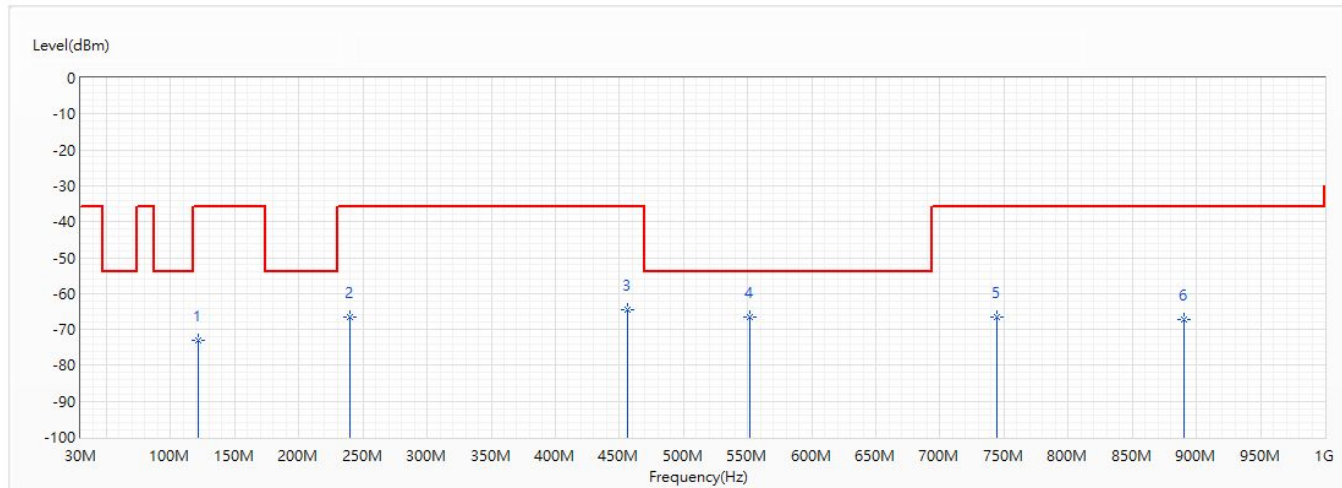


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	89.17	-69.91	-54.00	-15.91	-60.26	-9.65	PK
2	135.148	-68.27	-36.00	-32.27	-60.75	-7.52	PK
3	333.319	-70.49	-36.00	-34.49	-63.50	-6.99	PK
* 4	576.207	-66.33	-54.00	-12.33	-65.12	-1.21	PK
5	816.088	-65.49	-36.00	-29.49	-65.59	0.10	PK
6	968.475	-66.54	-36.00	-30.54	-67.41	0.87	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/2
Test Mode	Mode 1: Transmit Mode_External Dipole Ant._High Power	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2440MHz_2Mbps	Humidity (%RH)	57.0

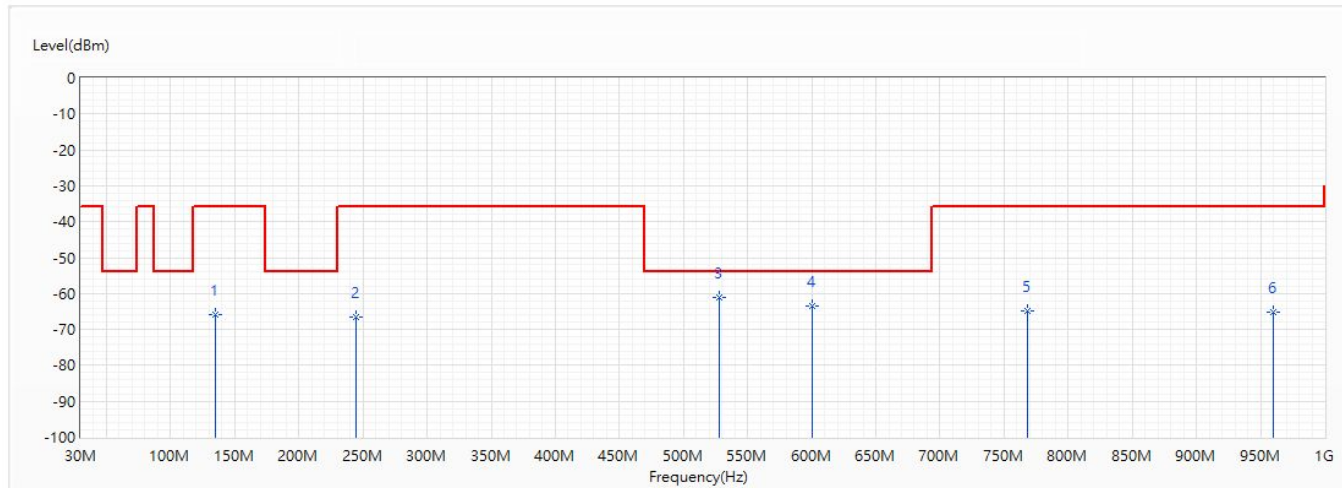


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	121.568	-73.06	-36.00	-37.06	-64.83	-8.23	PK
2	240.005	-66.48	-36.00	-30.48	-57.03	-9.45	PK
3	456.121	-64.49	-36.00	-28.49	-61.10	-3.39	PK
* 4	552.151	-66.40	-54.00	-12.40	-64.82	-1.58	PK
5	744.211	-66.70	-36.00	-30.70	-66.95	0.25	PK
6	890.099	-67.10	-36.00	-31.10	-67.57	0.47	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/2
Test Mode	Mode 1: Transmit Mode_External Dipole Ant._High Power	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2440MHz_2Mbps	Humidity (%RH)	57.0

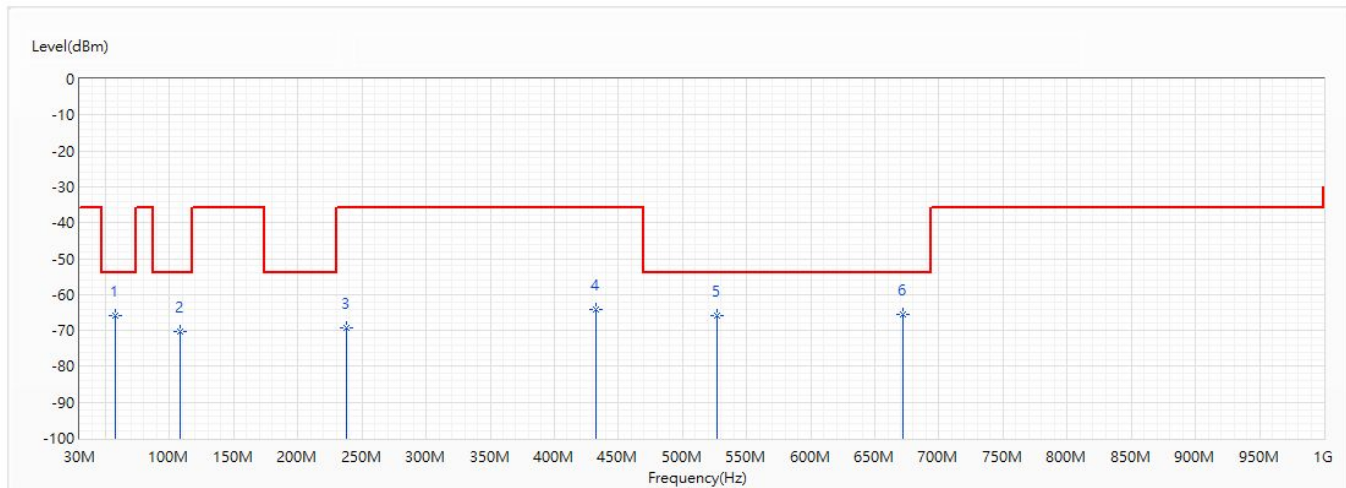


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	135.148	-65.73	-36.00	-29.73	-58.21	-7.52	PK
2	244.661	-66.58	-36.00	-30.58	-56.89	-9.69	PK
* 3	527.998	-60.97	-54.00	-6.97	-58.91	-2.06	PK
4	600.069	-63.32	-54.00	-9.32	-62.38	-0.94	PK
5	768.267	-64.96	-36.00	-28.96	-65.24	0.28	PK
6	960.133	-65.20	-36.00	-29.20	-66.03	0.83	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 3: Transmit mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2440MHz_1Mbps	Humidity (%RH)	57.0

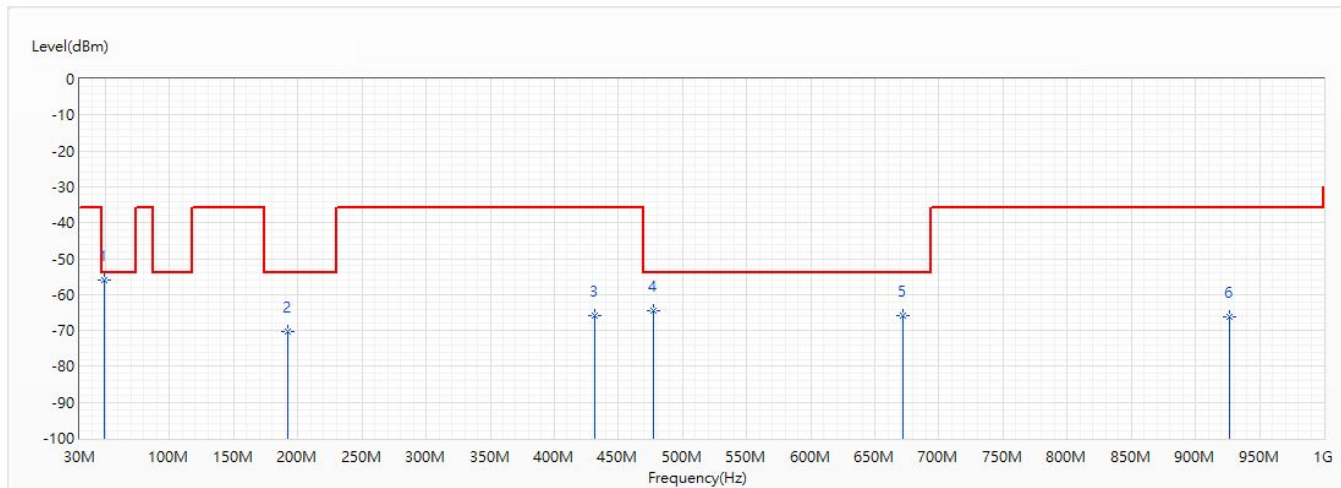


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	57.257	-65.80	-54.00	-11.80	-53.01	-12.79	PK
2	107.988	-70.28	-54.00	-16.28	-61.30	-8.98	PK
3	237.677	-69.22	-36.00	-33.22	-59.59	-9.63	PK
4	432.162	-64.11	-36.00	-28.11	-60.12	-3.99	PK
5	527.319	-65.80	-54.00	-11.80	-64.04	-1.76	PK
* 6	672.14	-65.60	-54.00	-11.60	-65.17	-0.43	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 3: Transmit mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2440MHz_1Mbps	Humidity (%RH)	57.0

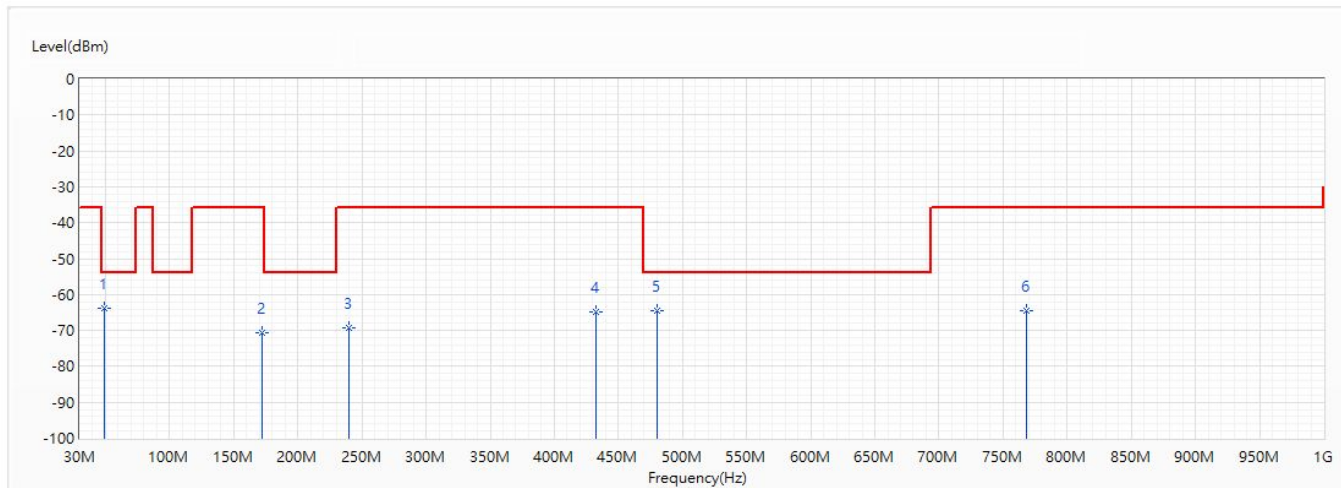


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
* 1	48.624	-56.05	-54.00	-2.05	-47.30	-8.75	PK
2	192.087	-70.39	-54.00	-16.39	-59.33	-11.06	PK
3	431.968	-65.84	-36.00	-29.84	-61.63	-4.21	PK
4	477.752	-64.43	-54.00	-10.43	-61.24	-3.19	PK
5	671.849	-65.95	-54.00	-11.95	-65.00	-0.95	PK
6	926.377	-66.09	-36.00	-30.09	-66.63	0.54	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 3: Transmit mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2440MHz_2Mbps	Humidity (%RH)	57.0

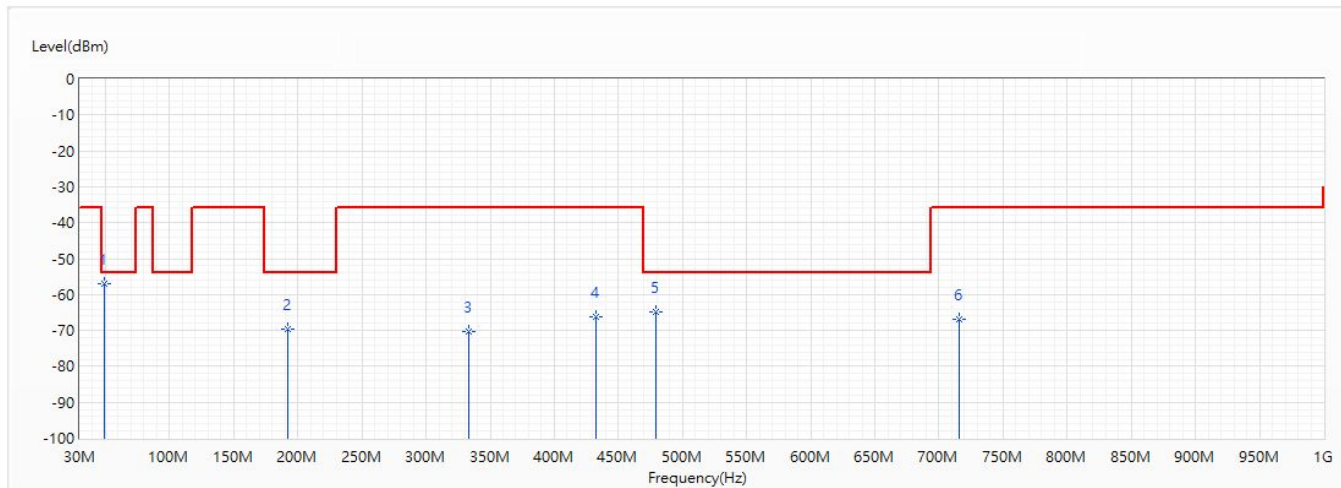


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
* 1	48.624	-63.85	-54.00	-9.85	-55.79	-8.06	PK
2	172.008	-70.62	-36.00	-34.62	-59.69	-10.93	PK
3	240.102	-69.22	-36.00	-33.22	-59.78	-9.44	PK
4	432.065	-64.93	-36.00	-28.93	-60.93	-4.00	PK
5	480.08	-64.38	-54.00	-10.38	-61.76	-2.62	PK
6	768.17	-64.36	-36.00	-28.36	-64.71	0.35	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 3: Transmit mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2440MHz_2Mbps	Humidity (%RH)	57.0

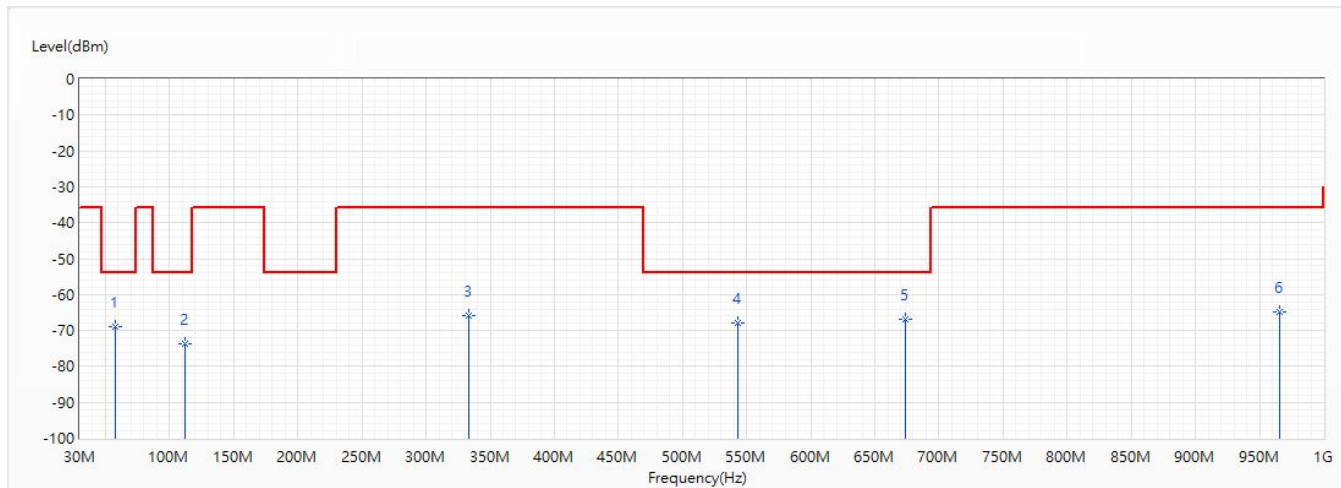


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
* 1	48.624	-57.13	-54.00	-3.13	-48.38	-8.75	PK
2	191.99	-69.53	-54.00	-15.53	-58.47	-11.06	PK
3	333.222	-70.47	-36.00	-34.47	-63.48	-6.99	PK
4	432.065	-66.22	-36.00	-30.22	-62.01	-4.21	PK
5	479.595	-64.78	-54.00	-10.78	-61.63	-3.15	PK
6	715.887	-66.80	-36.00	-30.80	-66.42	-0.38	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/7
Test Mode	Mode 4: Transmit mode_ External PIFA Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	23.0
Test Condition	2440MHz_1Mbps	Humidity (%RH)	51.0

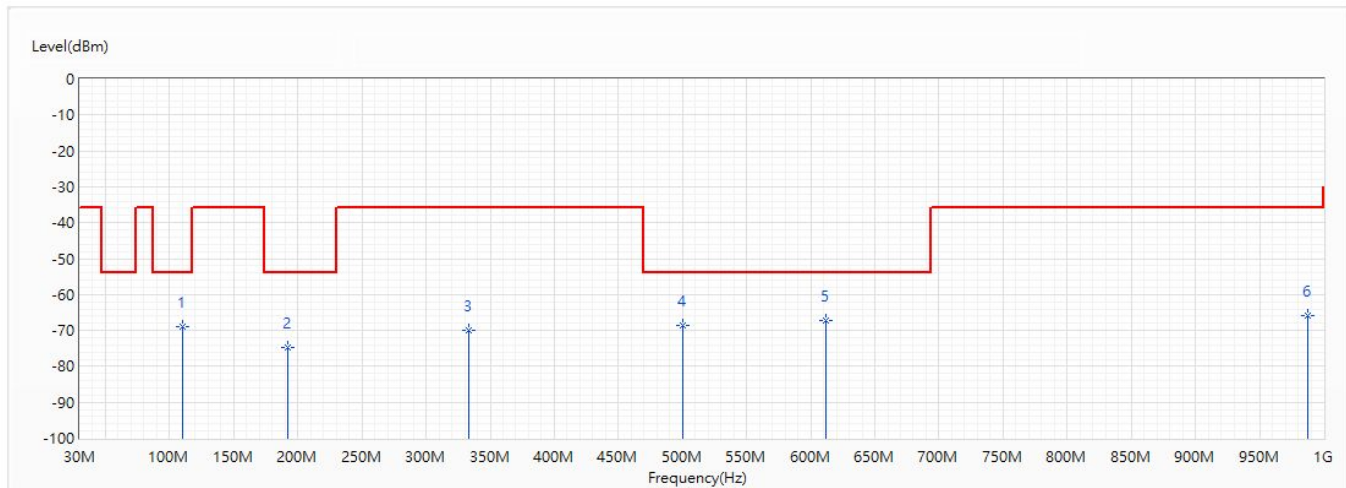


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	57.354	-68.85	-54.00	-14.85	-56.05	-12.80	PK
2	111.868	-73.60	-54.00	-19.60	-64.93	-8.67	PK
3	333.319	-65.94	-36.00	-29.94	-59.38	-6.56	PK
4	543.033	-67.91	-54.00	-13.91	-66.28	-1.63	PK
* 5	673.886	-66.86	-54.00	-12.86	-66.44	-0.42	PK
6	965.662	-64.84	-36.00	-28.84	-66.11	1.27	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/7
Test Mode	Mode 4: Transmit mode_ External PIFA Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	23.0
Test Condition	2440MHz_1Mbps	Humidity (%RH)	51.0

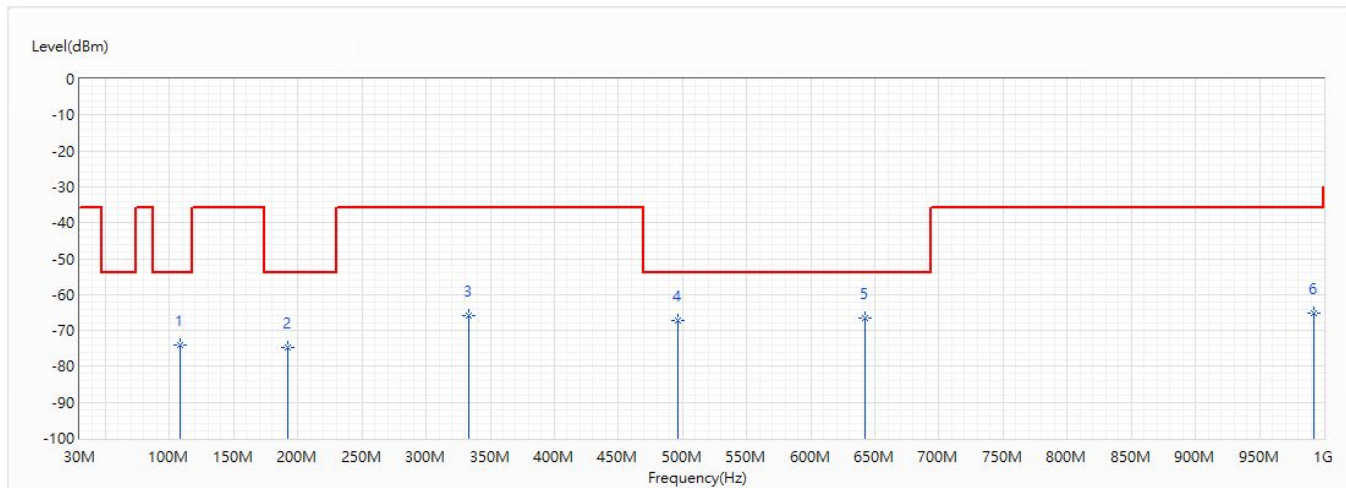


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	110.51	-69.11	-54.00	-15.11	-62.66	-6.45	PK
2	191.99	-74.71	-54.00	-20.71	-63.65	-11.06	PK
3	333.222	-69.83	-36.00	-33.83	-62.84	-6.99	PK
4	500.062	-68.52	-54.00	-14.52	-65.75	-2.77	PK
* 5	611.418	-67.34	-54.00	-13.34	-66.37	-0.97	PK
6	987.584	-65.79	-36.00	-29.79	-66.71	0.92	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/7
Test Mode	Mode 4: Transmit mode_ External PIFA Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	23.0
Test Condition	2440MHz_2Mbps	Humidity (%RH)	51.0

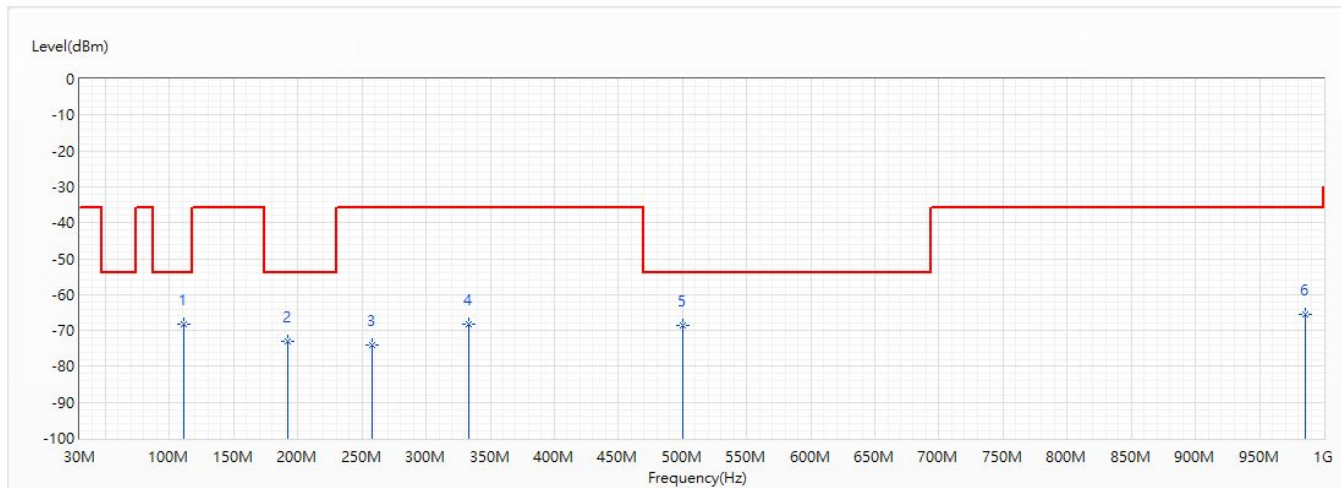


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	107.988	-74.13	-54.00	-20.13	-65.15	-8.98	PK
2	191.99	-74.87	-54.00	-20.87	-62.34	-12.53	PK
3	333.319	-66.02	-36.00	-30.02	-59.46	-6.56	PK
4	496.279	-67.23	-54.00	-13.23	-65.12	-2.11	PK
* 5	642.361	-66.49	-54.00	-12.49	-65.74	-0.75	PK
6	992.143	-65.22	-36.00	-29.22	-66.80	1.58	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/7
Test Mode	Mode 4: Transmit mode_ External PIFA Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	23.0
Test Condition	2440MHz_2Mbps	Humidity (%RH)	51.0

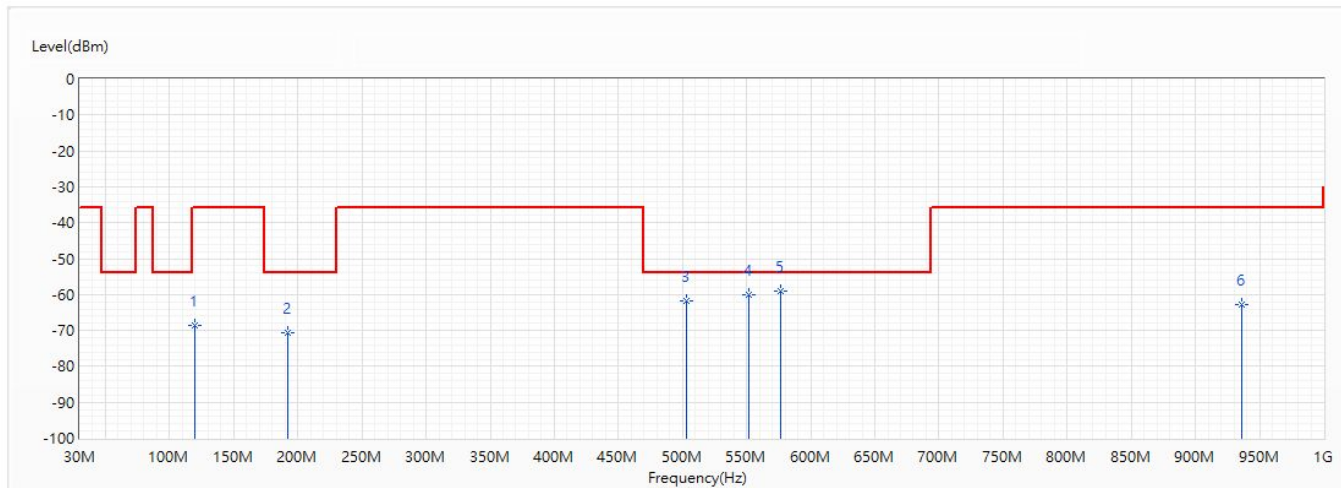


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
* 1	110.607	-68.33	-54.00	-14.33	-61.88	-6.45	PK
2	191.99	-72.93	-54.00	-18.93	-61.87	-11.06	PK
3	258.047	-74.04	-36.00	-38.04	-64.72	-9.32	PK
4	333.222	-68.12	-36.00	-32.12	-61.13	-6.99	PK
5	500.062	-68.60	-54.00	-14.60	-65.83	-2.77	PK
6	986.129	-65.56	-36.00	-29.56	-66.48	0.92	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 5: Transmit mode_ Internal PCB Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2440MHz_1Mbps	Humidity (%RH)	57.0

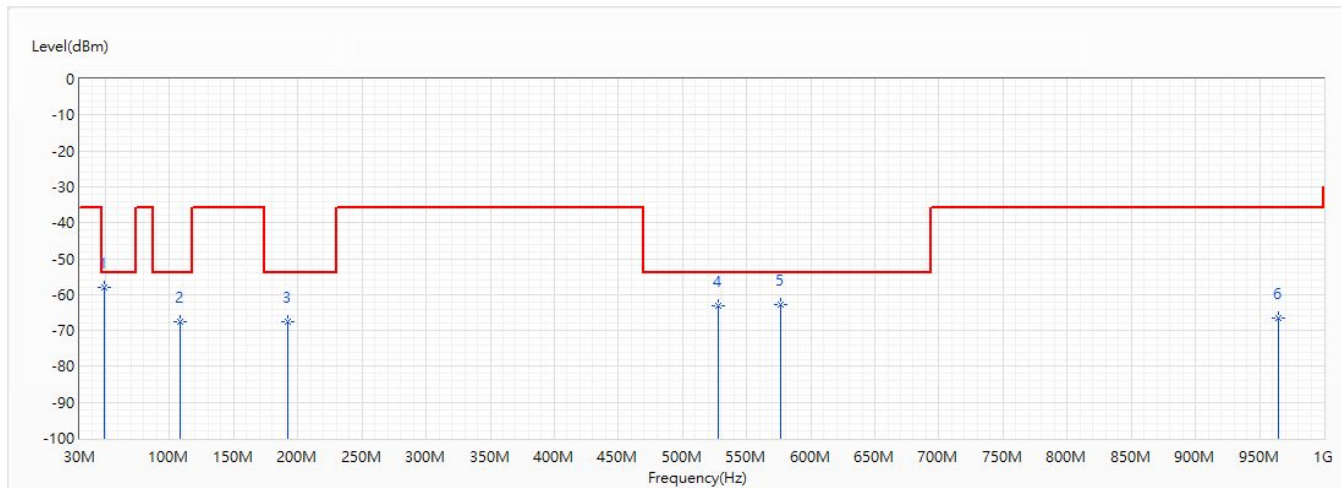


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	119.919	-68.71	-36.00	-32.71	-60.44	-8.27	PK
2	191.99	-70.64	-54.00	-16.64	-58.11	-12.53	PK
3	503.36	-61.81	-54.00	-7.81	-59.84	-1.97	PK
4	551.957	-60.09	-54.00	-6.09	-58.51	-1.58	PK
* 5	576.304	-59.19	-54.00	-5.19	-57.40	-1.79	PK
6	936.271	-62.82	-36.00	-26.82	-63.69	0.87	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 5: Transmit mode_ Internal PCB Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2440MHz_1Mbps	Humidity (%RH)	57.0

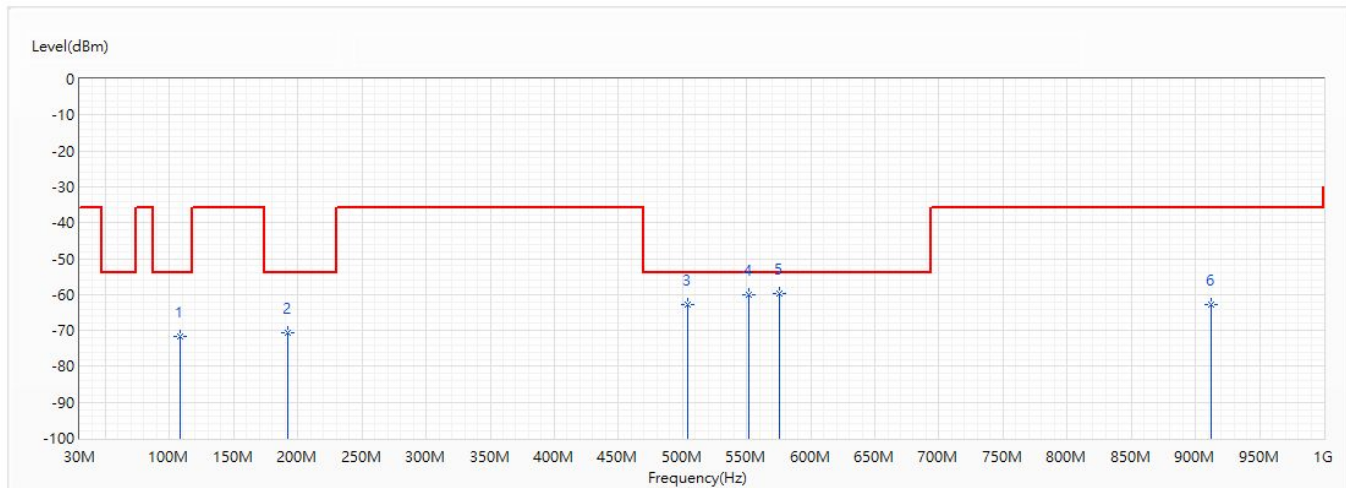


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
* 1	48.624	-57.90	-54.00	-3.90	-49.15	-8.75	PK
2	107.988	-67.74	-54.00	-13.74	-60.95	-6.79	PK
3	191.99	-67.69	-54.00	-13.69	-56.63	-11.06	PK
4	527.901	-63.24	-54.00	-9.24	-61.18	-2.06	PK
5	576.11	-62.80	-54.00	-8.80	-61.59	-1.21	PK
6	964.304	-66.55	-36.00	-30.55	-67.39	0.84	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 5: Transmit mode_ Internal PCB Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2440MHz_2Mbps	Humidity (%RH)	57.0

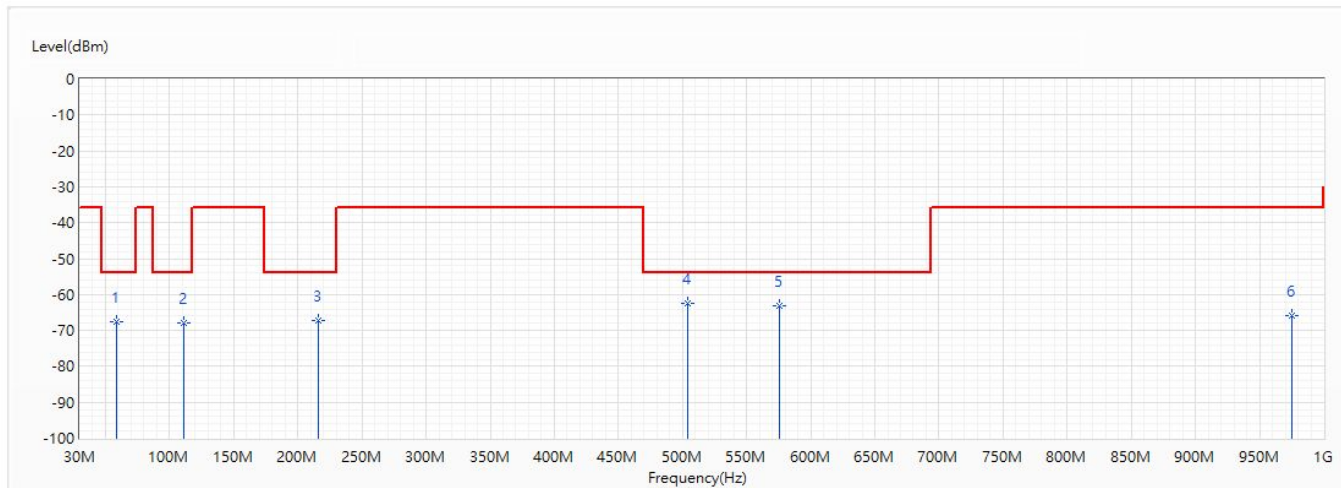


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	107.988	-71.60	-54.00	-17.60	-62.62	-8.98	PK
2	191.99	-70.73	-54.00	-16.73	-58.20	-12.53	PK
3	504.039	-62.71	-54.00	-8.71	-60.75	-1.96	PK
4	552.151	-60.09	-54.00	-6.09	-58.51	-1.58	PK
* 5	576.013	-59.79	-54.00	-5.79	-58.01	-1.78	PK
6	912.215	-62.72	-36.00	-26.72	-63.23	0.51	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 5: Transmit mode_ Internal PCB Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2440MHz_2Mbps	Humidity (%RH)	57.0



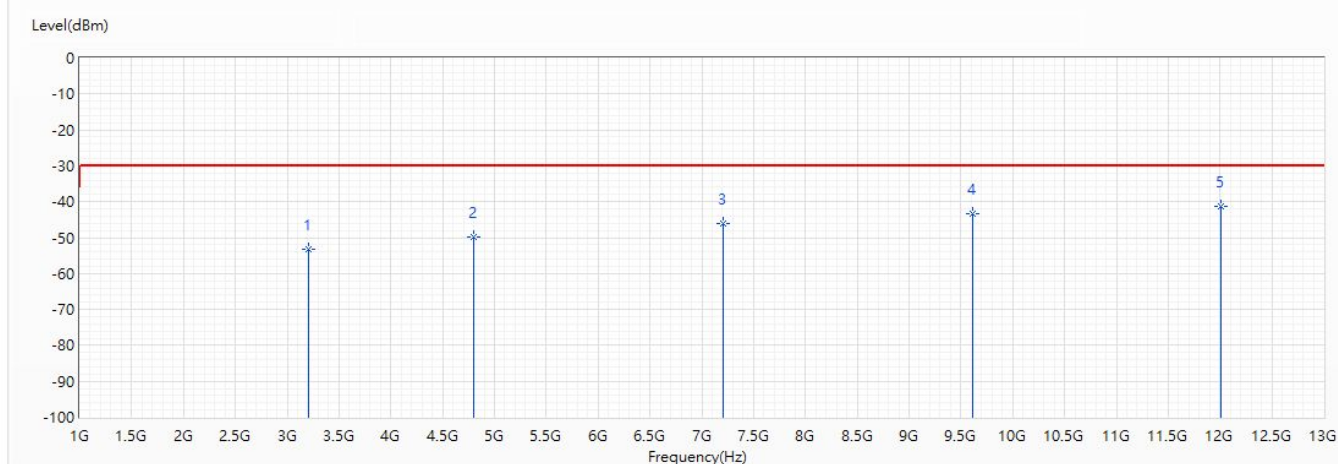
No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	58.809	-67.47	-54.00	-13.47	-54.67	-12.80	PK
2	110.607	-68.02	-54.00	-14.02	-61.57	-6.45	PK
3	216.046	-67.37	-54.00	-13.37	-56.95	-10.42	PK
* 4	504.136	-62.39	-54.00	-8.39	-59.72	-2.67	PK
5	575.916	-63.30	-54.00	-9.30	-62.09	-1.21	PK
6	975.653	-65.80	-36.00	-29.80	-66.69	0.89	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Above 1GHz Spurious:

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 1: Transmit Mode_External Dipole Ant._High Power	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	23.1
Test Condition	2402MHz_1Mbps	Humidity (%RH)	52.0

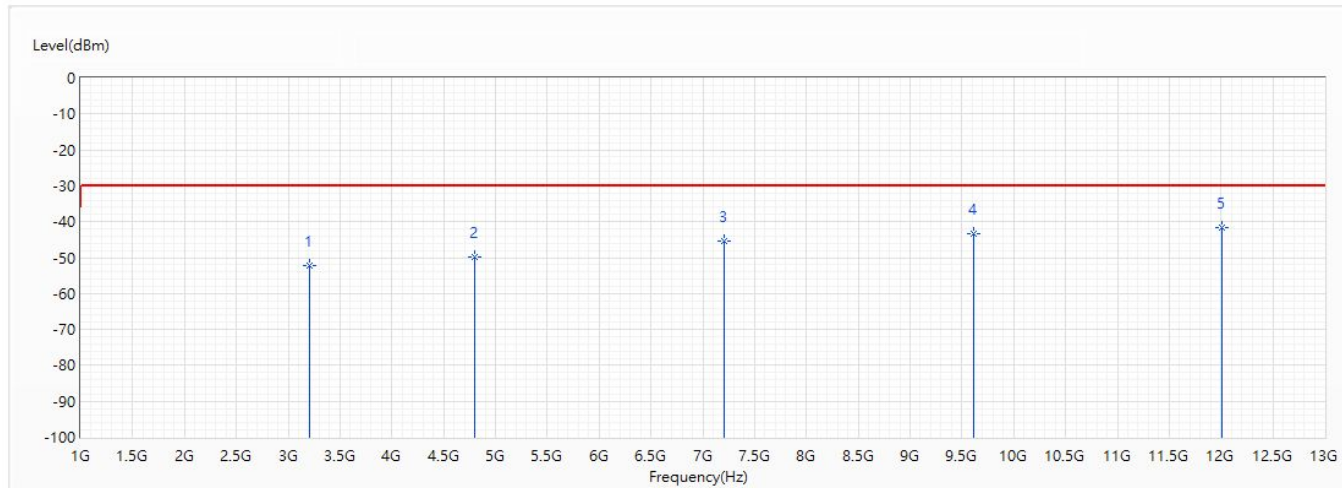


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3202.667	-53.08	-30.00	-23.08	-64.36	11.28	PK
2	4804	-49.94	-30.00	-19.94	-63.97	14.03	PK
3	7206	-46.24	-30.00	-16.24	-67.30	21.06	PK
4	9608	-43.35	-30.00	-13.35	-69.35	26.00	PK
* 5	12010	-41.24	-30.00	-11.24	-70.19	28.95	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 1: Transmit Mode_External Dipole Ant._High Power	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	23.1
Test Condition	2402MHz_1Mbps	Humidity (%RH)	52.0

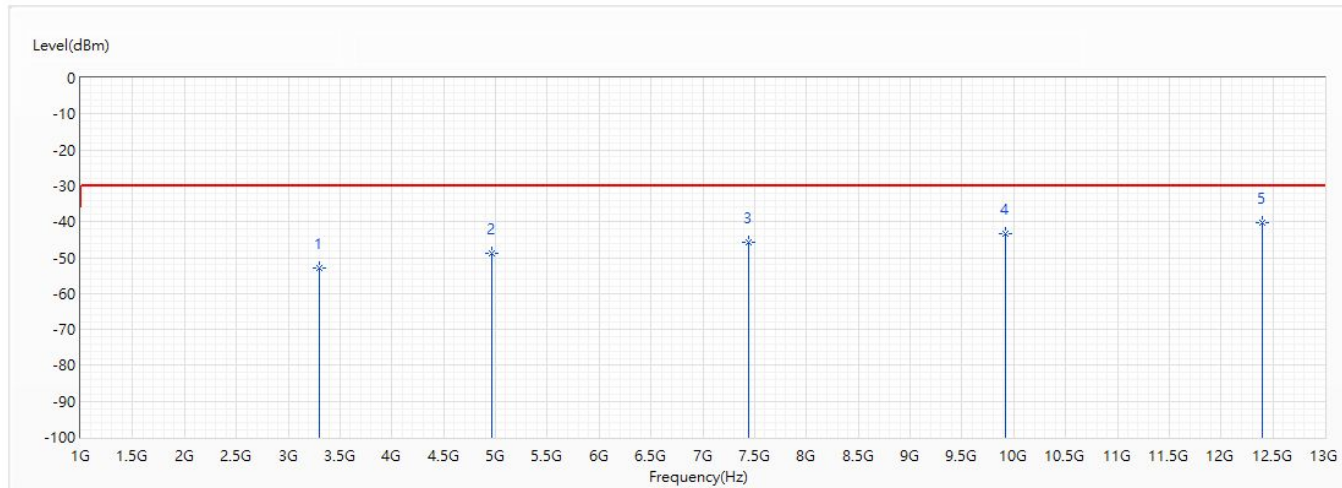


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3202.667	-52.05	-30.00	-22.05	-63.68	11.63	PK
2	4804	-49.87	-30.00	-19.87	-64.10	14.23	PK
3	7206	-45.37	-30.00	-15.37	-65.85	20.48	PK
4	9608	-43.50	-30.00	-13.50	-69.60	26.10	PK
* 5	12010	-41.68	-30.00	-11.68	-70.62	28.94	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 1: Transmit Mode_External Dipole Ant._High Power	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	23.1
Test Condition	2480MHz_1Mbps	Humidity (%RH)	52.0

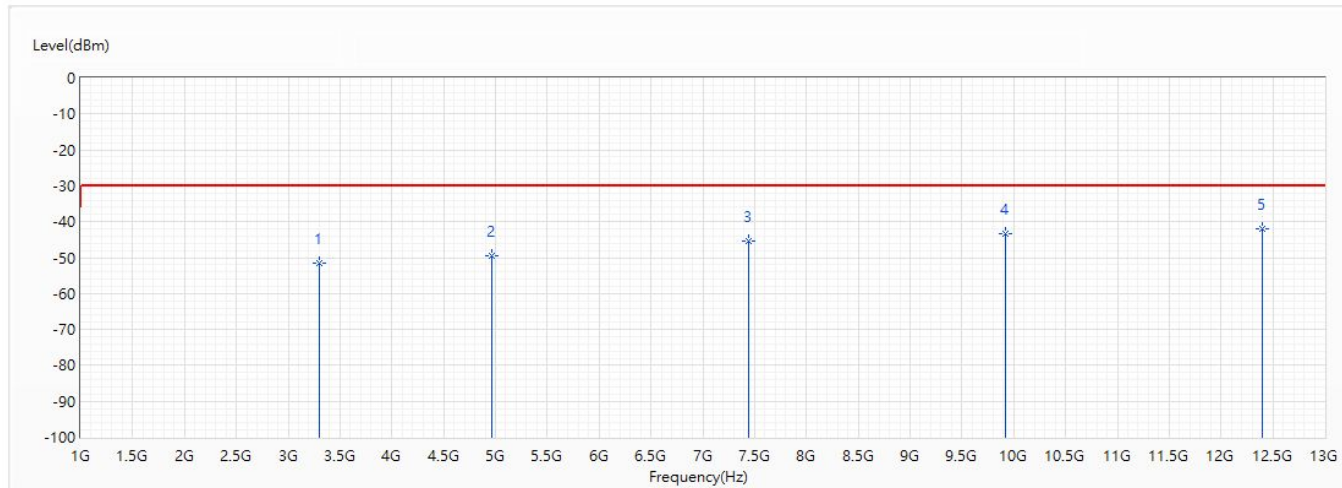


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3306.667	-52.99	-30.00	-22.99	-64.59	11.60	PK
2	4960	-48.92	-30.00	-18.92	-63.39	14.47	PK
3	7440	-45.89	-30.00	-15.89	-68.31	22.42	PK
4	9920	-43.23	-30.00	-13.23	-70.60	27.37	PK
* 5	12400	-40.41	-30.00	-10.41	-69.44	29.03	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 1: Transmit Mode_External Dipole Ant._High Power	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	23.1
Test Condition	2480MHz_1Mbps	Humidity (%RH)	52.0

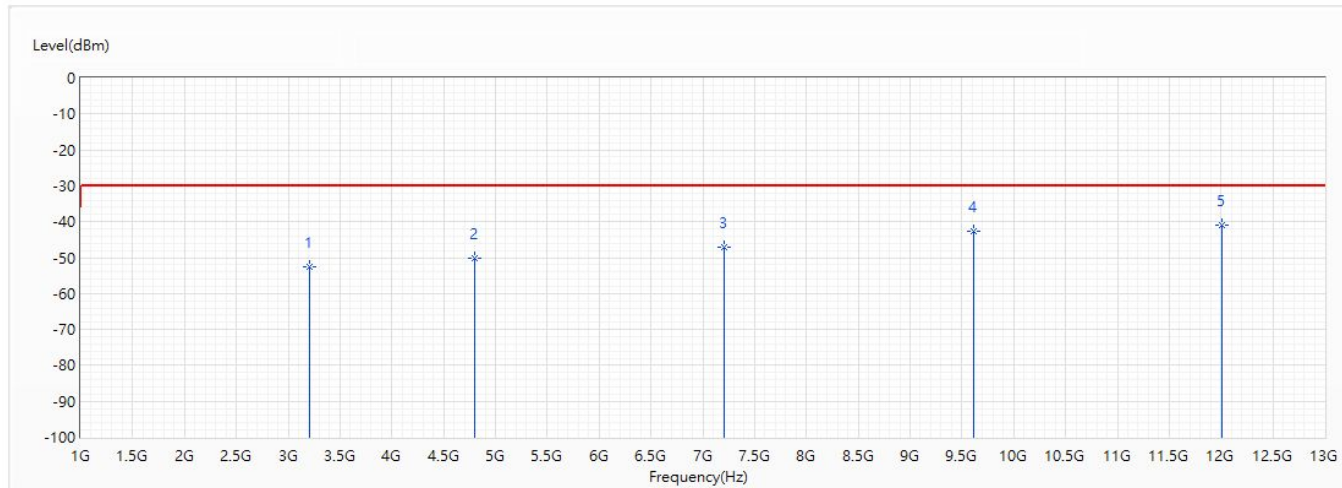


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3306.667	-51.66	-30.00	-21.66	-63.52	11.86	PK
2	4960	-49.45	-30.00	-19.45	-64.09	14.64	PK
3	7440	-45.45	-30.00	-15.45	-67.24	21.79	PK
4	9920	-43.25	-30.00	-13.25	-70.49	27.24	PK
* 5	12400	-42.01	-30.00	-12.01	-71.48	29.47	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 1: Transmit Mode_External Dipole Ant._High Power	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	23.1
Test Condition	2402MHz_2Mbps	Humidity (%RH)	52.0

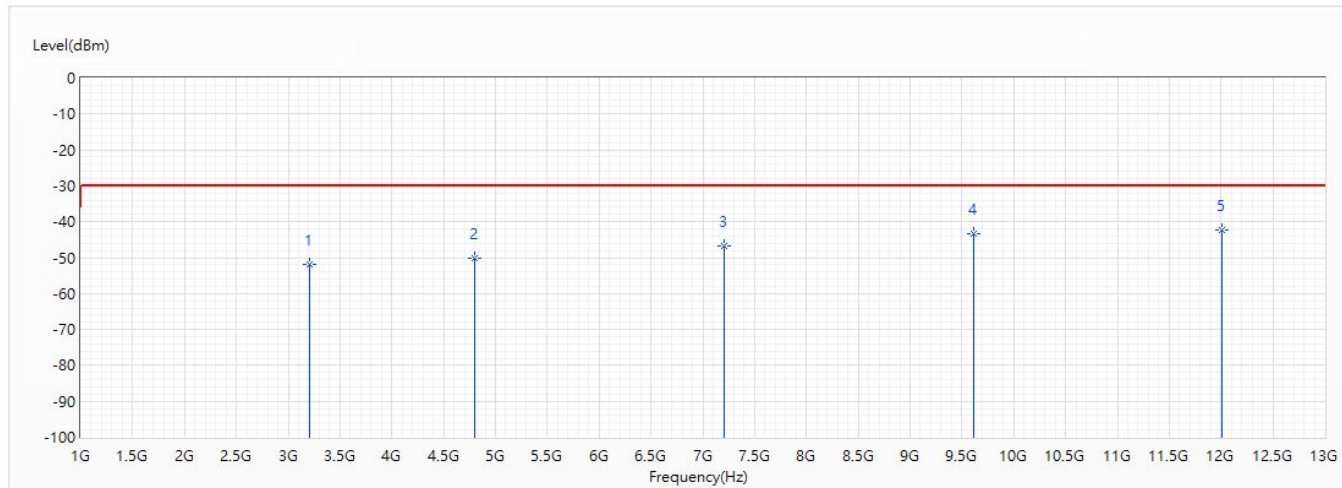


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3202.667	-52.40	-30.00	-22.40	-63.68	11.28	PK
2	4804	-50.11	-30.00	-20.11	-64.14	14.03	PK
3	7206	-47.06	-30.00	-17.06	-68.12	21.06	PK
4	9608	-42.66	-30.00	-12.66	-68.66	26.00	PK
* 5	12010	-40.90	-30.00	-10.90	-69.85	28.95	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 1: Transmit Mode_External Dipole Ant._High Power	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	23.1
Test Condition	2402MHz_2Mbps	Humidity (%RH)	52.0

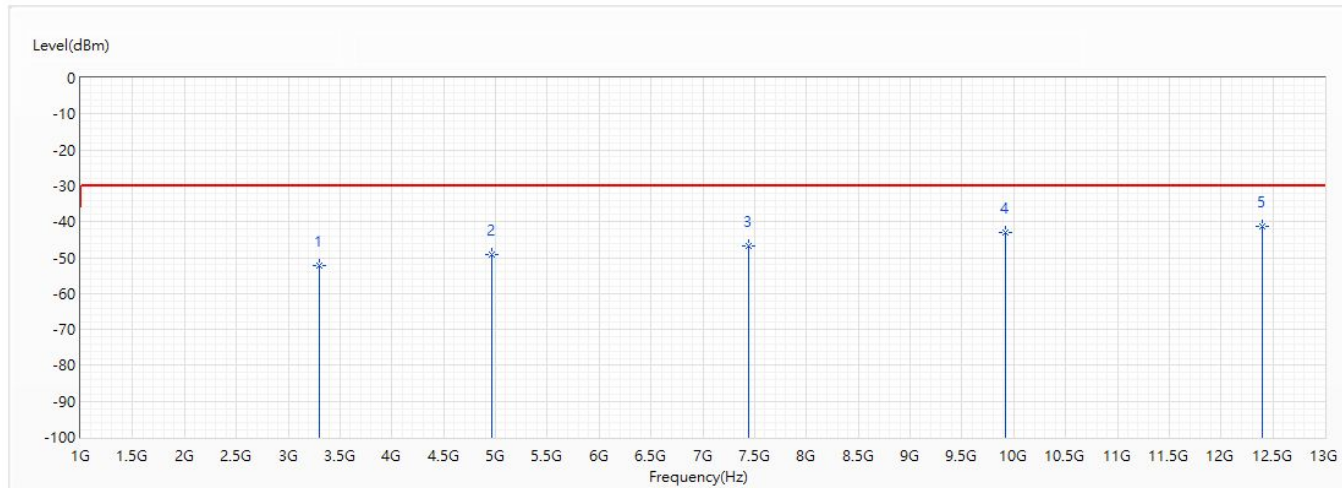


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3202.667	-51.86	-30.00	-21.86	-63.49	11.63	PK
2	4804	-50.21	-30.00	-20.21	-64.44	14.23	PK
3	7206	-46.70	-30.00	-16.70	-67.18	20.48	PK
4	9608	-43.31	-30.00	-13.31	-69.41	26.10	PK
* 5	12010	-42.21	-30.00	-12.21	-71.15	28.94	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 1: Transmit Mode_External Dipole Ant._High Power	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	23.1
Test Condition	2480MHz_2Mbps	Humidity (%RH)	52.0

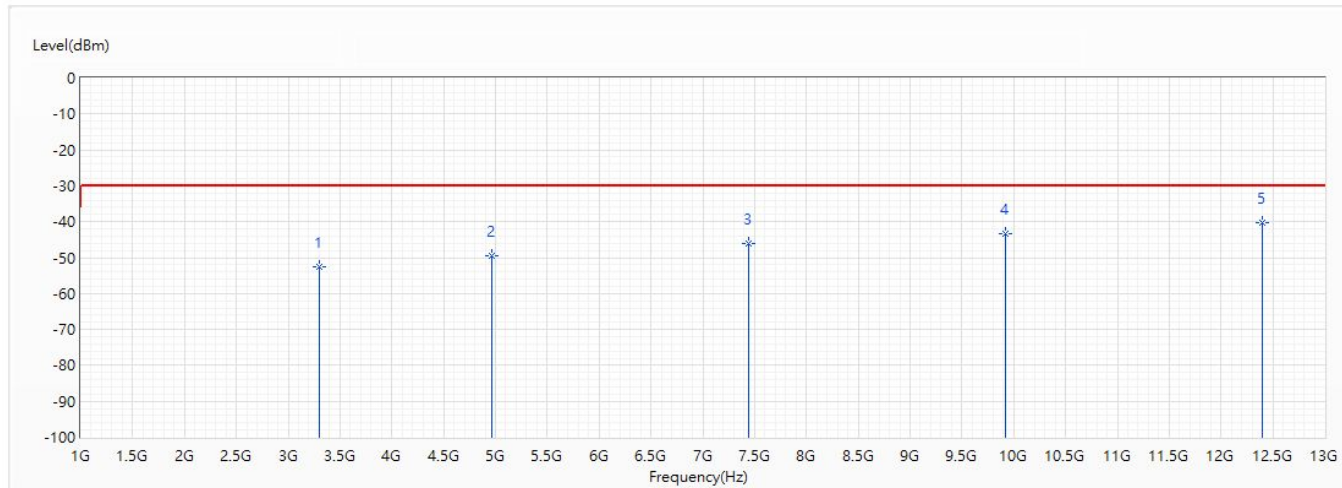


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3306.667	-52.19	-30.00	-22.19	-63.79	11.60	PK
2	4960	-49.09	-30.00	-19.09	-63.56	14.47	PK
3	7440	-46.70	-30.00	-16.70	-69.12	22.42	PK
4	9920	-42.93	-30.00	-12.93	-70.30	27.37	PK
* 5	12400	-41.15	-30.00	-11.15	-70.18	29.03	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 1: Transmit Mode_External Dipole Ant._High Power	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	23.1
Test Condition	2480MHz_2Mbps	Humidity (%RH)	52.0

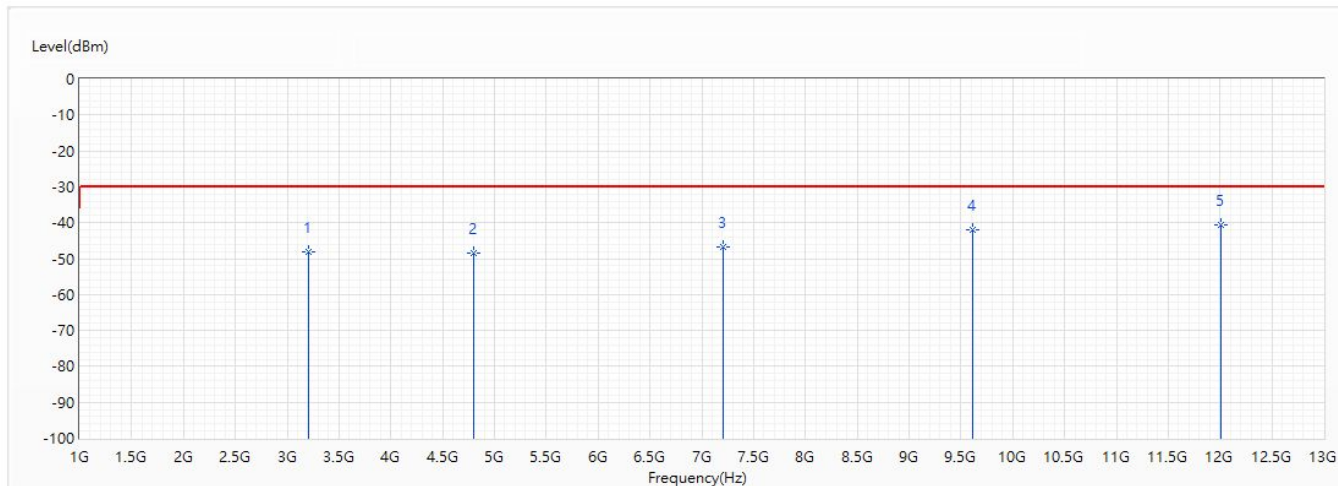


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3306.667	-52.66	-30.00	-22.66	-64.52	11.86	PK
2	4960	-49.65	-30.00	-19.65	-64.29	14.64	PK
3	7440	-46.08	-30.00	-16.08	-67.87	21.79	PK
4	9920	-43.30	-30.00	-13.30	-70.54	27.24	PK
* 5	12400	-40.33	-30.00	-10.33	-69.80	29.47	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 3: Transmit mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2402MHz_1Mbps	Humidity (%RH)	57.0

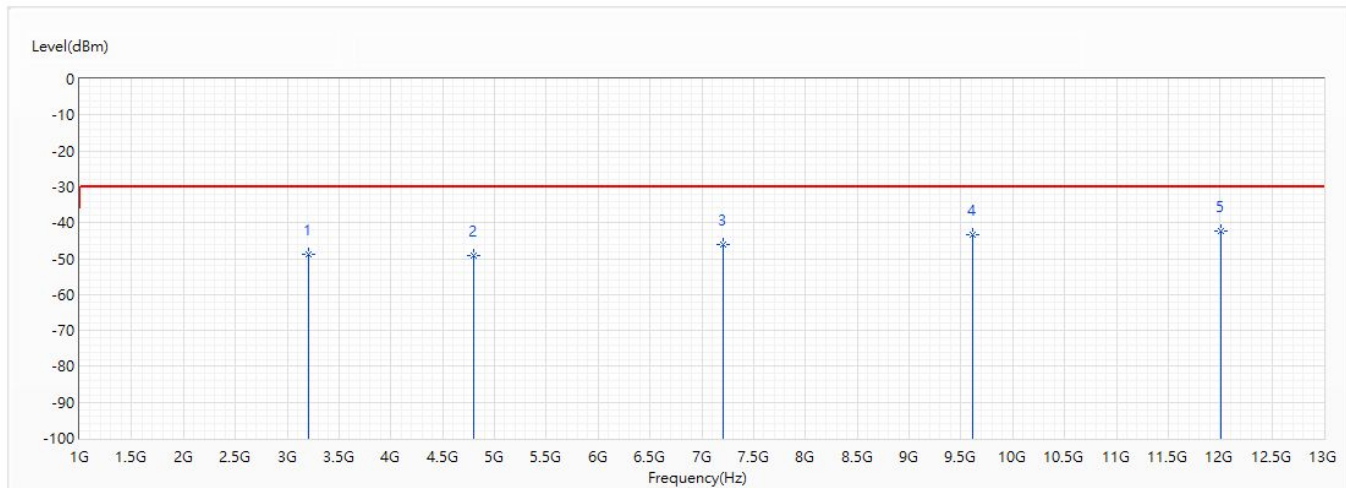


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3202.667	-48.10	-30.00	-18.10	-59.38	11.28	PK
2	4804	-48.48	-30.00	-18.48	-62.51	14.03	PK
3	7206	-46.81	-30.00	-16.81	-67.87	21.06	PK
4	9608	-42.08	-30.00	-12.08	-68.08	26.00	PK
* 5	12010	-40.69	-30.00	-10.69	-69.64	28.95	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 3: Transmit mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2402MHz_1Mbps	Humidity (%RH)	57.0

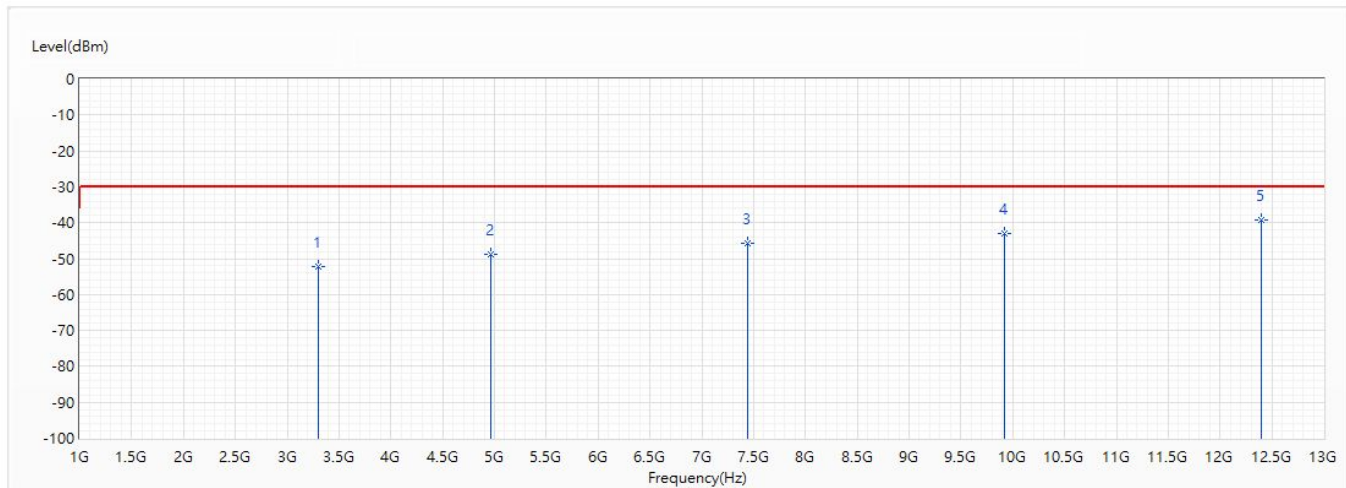


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3202.667	-48.69	-30.00	-18.69	-60.32	11.63	PK
2	4804	-49.25	-30.00	-19.25	-63.48	14.23	PK
3	7206	-46.07	-30.00	-16.07	-66.55	20.48	PK
4	9608	-43.28	-30.00	-13.28	-69.38	26.10	PK
* 5	12010	-42.48	-30.00	-12.48	-71.42	28.94	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 3: Transmit mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2480MHz_ 1Mbps	Humidity (%RH)	57.0

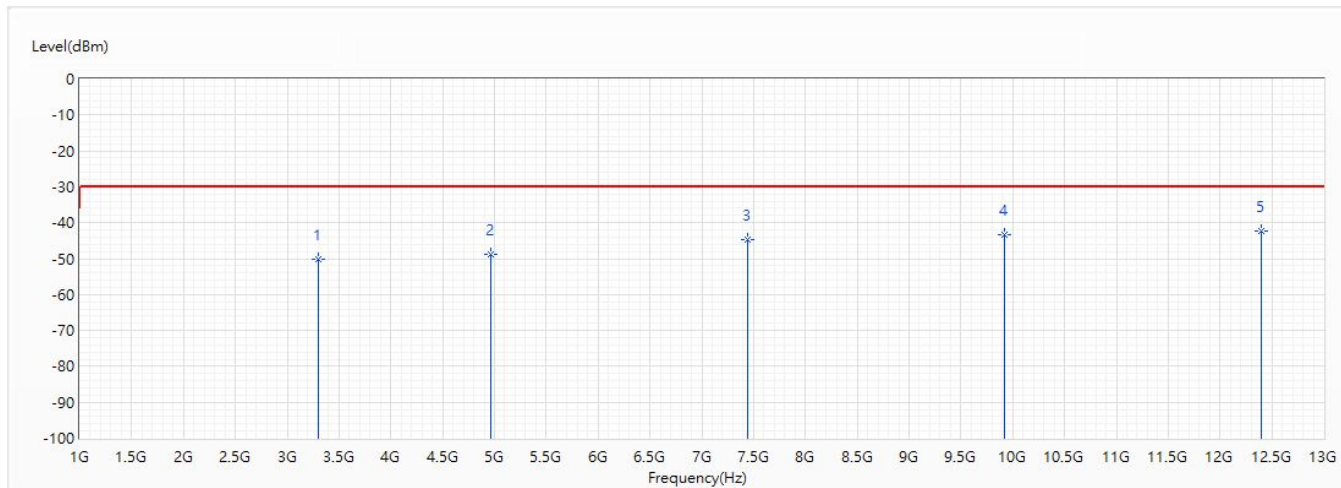


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3306.667	-52.10	-30.00	-22.10	-63.70	11.60	PK
2	4960	-48.73	-30.00	-18.73	-63.20	14.47	PK
3	7440	-45.59	-30.00	-15.59	-68.01	22.42	PK
4	9920	-43.00	-30.00	-13.00	-70.37	27.37	PK
* 5	12400	-39.39	-30.00	-9.39	-68.42	29.03	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 3: Transmit mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2480MHz_1Mbps	Humidity (%RH)	57.0

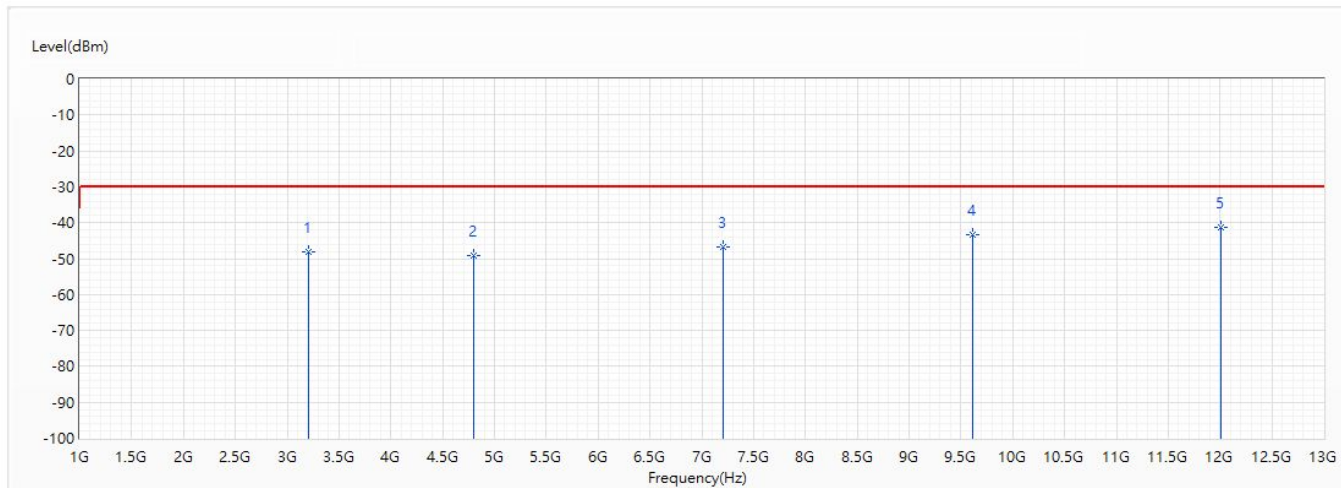


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3306.667	-50.11	-30.00	-20.11	-61.97	11.86	PK
2	4960	-48.94	-30.00	-18.94	-63.58	14.64	PK
3	7440	-44.78	-30.00	-14.78	-66.57	21.79	PK
4	9920	-43.44	-30.00	-13.44	-70.68	27.24	PK
* 5	12400	-42.48	-30.00	-12.48	-71.95	29.47	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 3: Transmit mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2402MHz_2Mbps	Humidity (%RH)	57.0

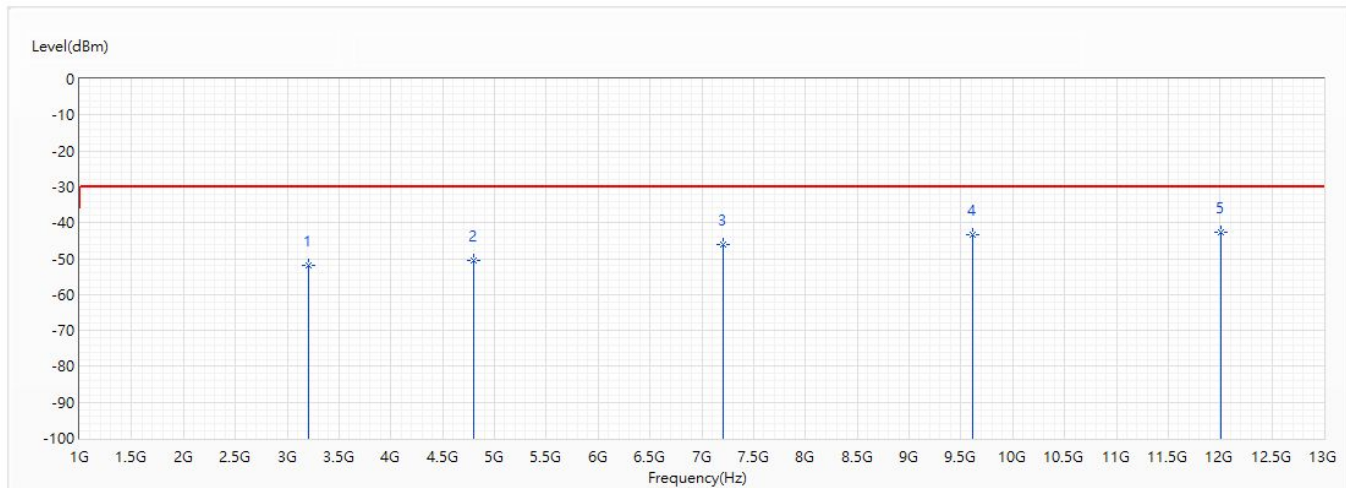


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3202.667	-48.03	-30.00	-18.03	-59.31	11.28	PK
2	4804	-49.28	-30.00	-19.28	-63.31	14.03	PK
3	7206	-46.67	-30.00	-16.67	-67.73	21.06	PK
4	9608	-43.40	-30.00	-13.40	-69.40	26.00	PK
* 5	12010	-41.33	-30.00	-11.33	-70.28	28.95	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 3: Transmit mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2402MHz_2Mbps	Humidity (%RH)	57.0

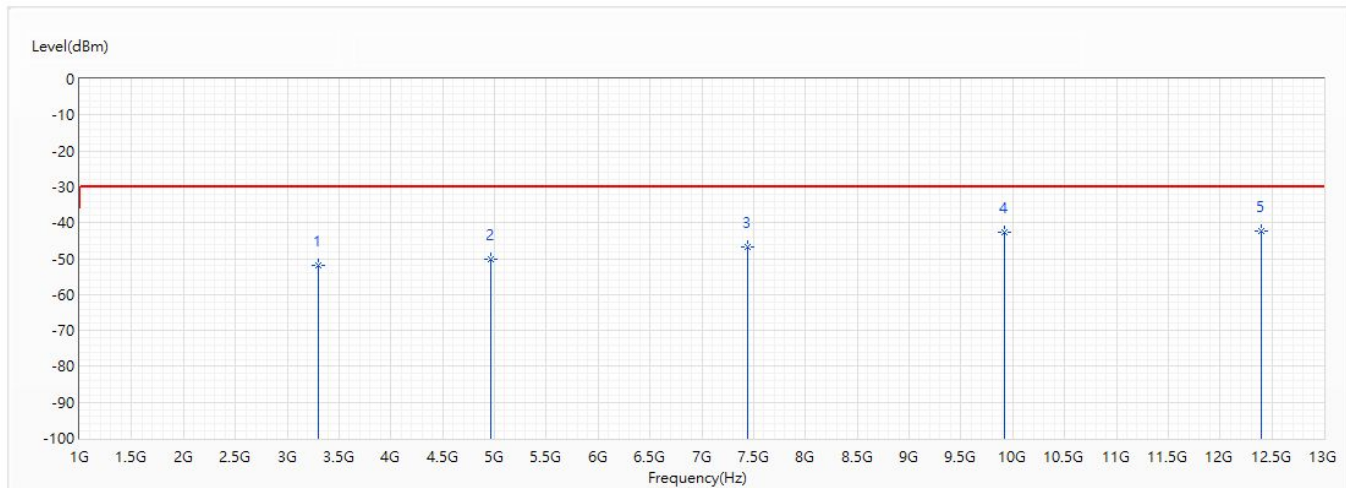


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3202.667	-52.02	-30.00	-22.02	-63.65	11.63	PK
2	4804	-50.42	-30.00	-20.42	-64.65	14.23	PK
3	7206	-46.05	-30.00	-16.05	-66.53	20.48	PK
4	9608	-43.35	-30.00	-13.35	-69.45	26.10	PK
* 5	12010	-42.61	-30.00	-12.61	-71.55	28.94	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 3: Transmit mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2480MHz_2Mbps	Humidity (%RH)	57.0

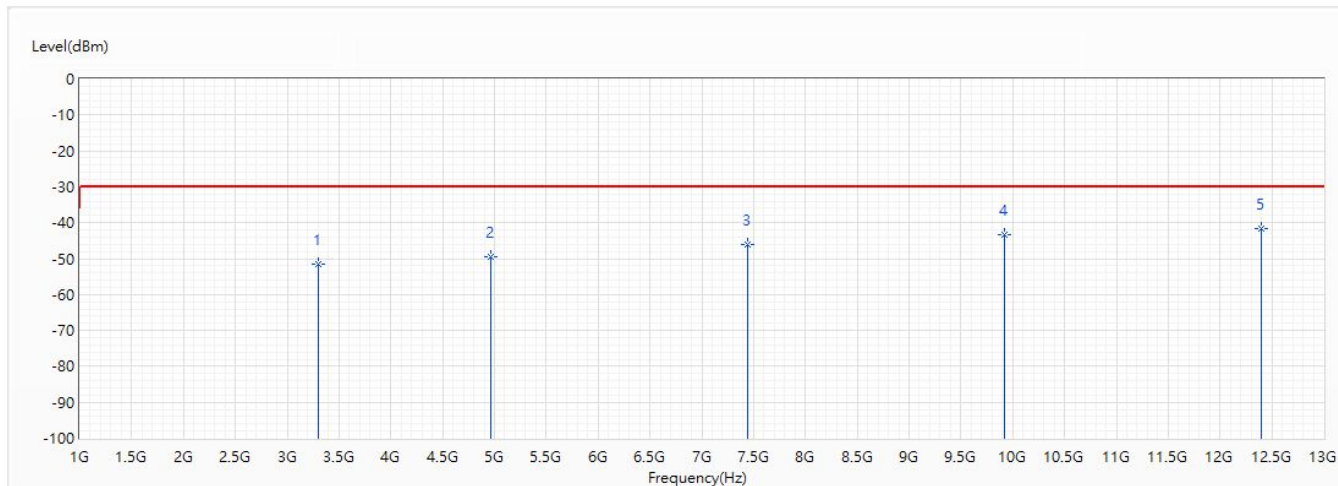


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3306.667	-51.79	-30.00	-21.79	-63.39	11.60	PK
2	4960	-50.11	-30.00	-20.11	-64.58	14.47	PK
3	7440	-46.68	-30.00	-16.68	-69.10	22.42	PK
4	9920	-42.76	-30.00	-12.76	-70.13	27.37	PK
* 5	12400	-42.41	-30.00	-12.41	-71.44	29.03	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 3: Transmit mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2480MHz_2Mbps	Humidity (%RH)	57.0

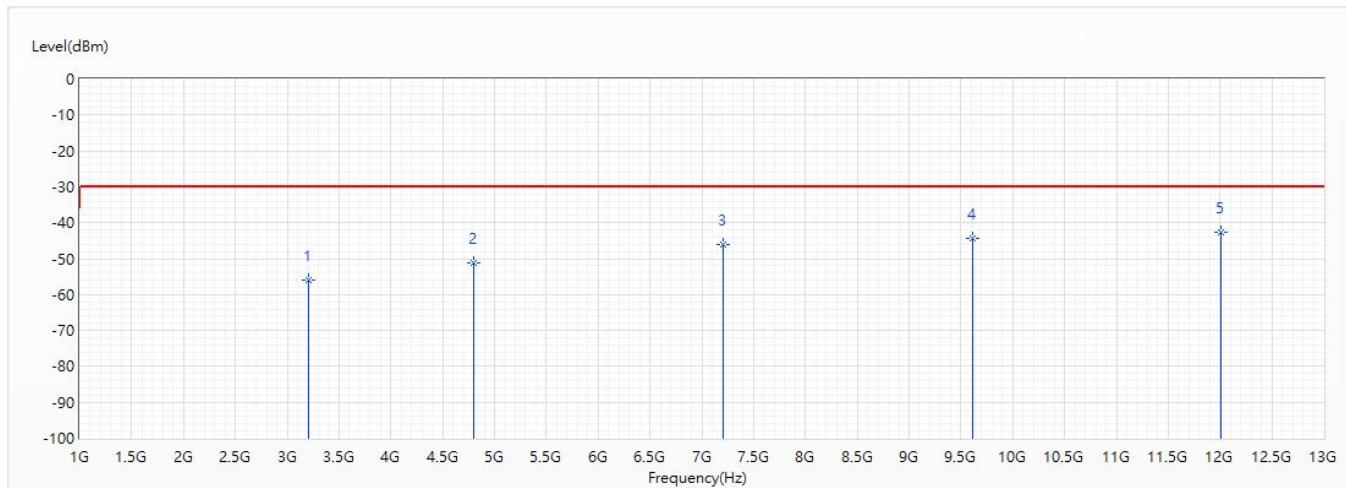


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3306.667	-51.54	-30.00	-21.54	-63.40	11.86	PK
2	4960	-49.64	-30.00	-19.64	-64.28	14.64	PK
3	7440	-45.98	-30.00	-15.98	-67.77	21.79	PK
4	9920	-43.32	-30.00	-13.32	-70.56	27.24	PK
* 5	12400	-41.71	-30.00	-11.71	-71.18	29.47	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/2
Test Mode	Mode 4: Transmit mode_ External PIFA Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2402MHz_1Mbps	Humidity (%RH)	57.0

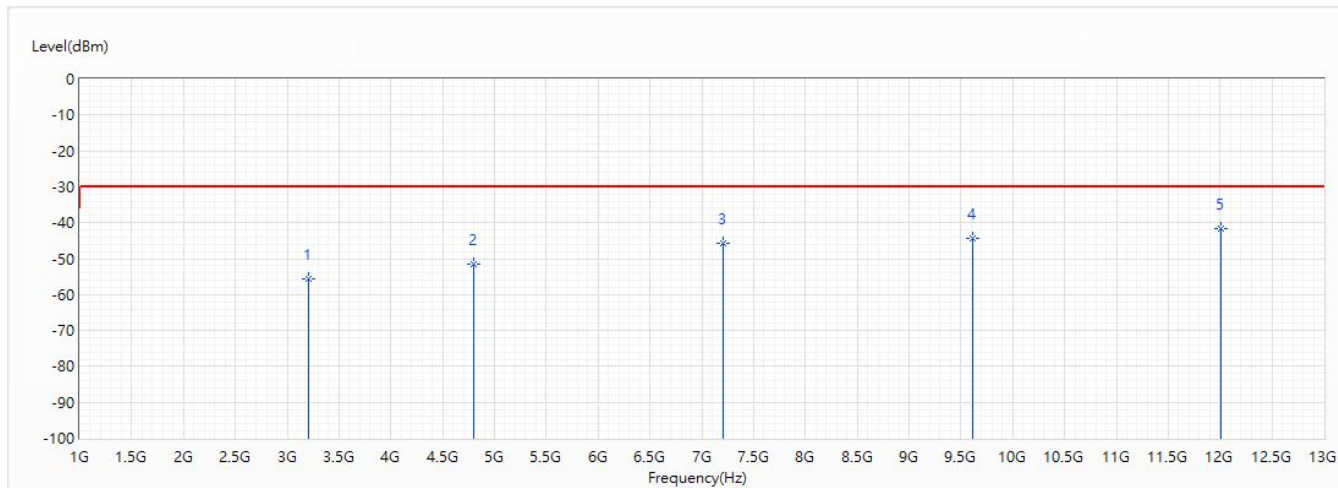


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3202.667	-55.81	-30.00	-25.81	-67.09	11.28	PK
2	4804	-51.20	-30.00	-21.20	-65.23	14.03	PK
3	7206	-46.21	-30.00	-16.21	-67.27	21.06	PK
4	9608	-44.36	-30.00	-14.36	-70.36	26.00	PK
* 5	12010	-42.70	-30.00	-12.70	-71.65	28.95	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/2
Test Mode	Mode 4: Transmit mode_ External PIFA Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2402MHz_1Mbps	Humidity (%RH)	57.0

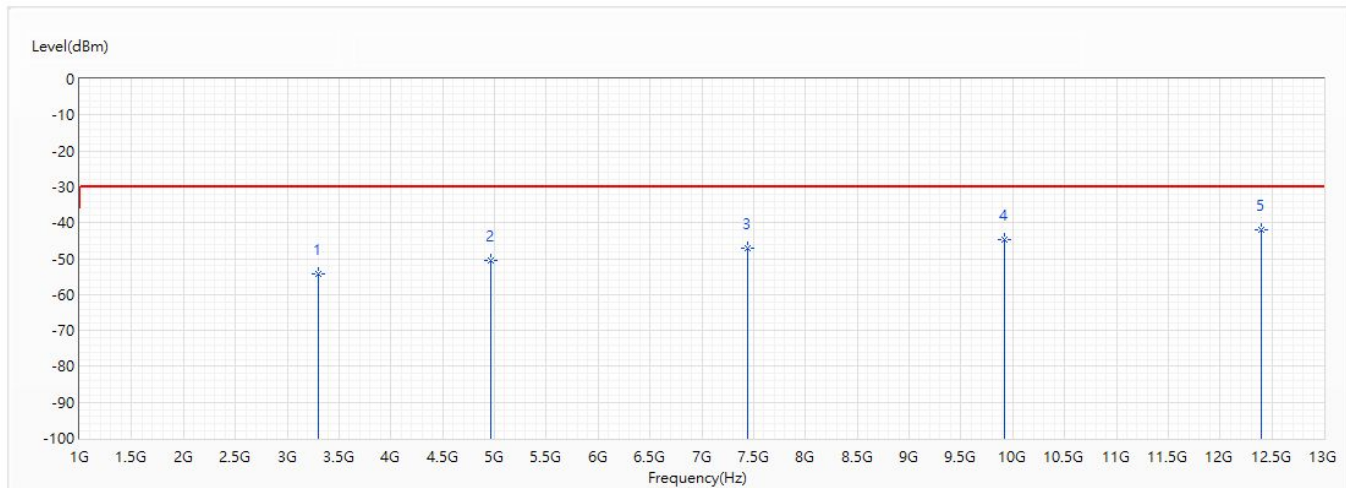


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3202.667	-55.77	-30.00	-25.77	-67.40	11.63	PK
2	4804	-51.38	-30.00	-21.38	-65.61	14.23	PK
3	7206	-45.77	-30.00	-15.77	-66.25	20.48	PK
4	9608	-44.25	-30.00	-14.25	-70.35	26.10	PK
* 5	12010	-41.63	-30.00	-11.63	-70.57	28.94	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/2
Test Mode	Mode 4: Transmit mode_ External PIFA Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2480MHz_1Mbps	Humidity (%RH)	57.0

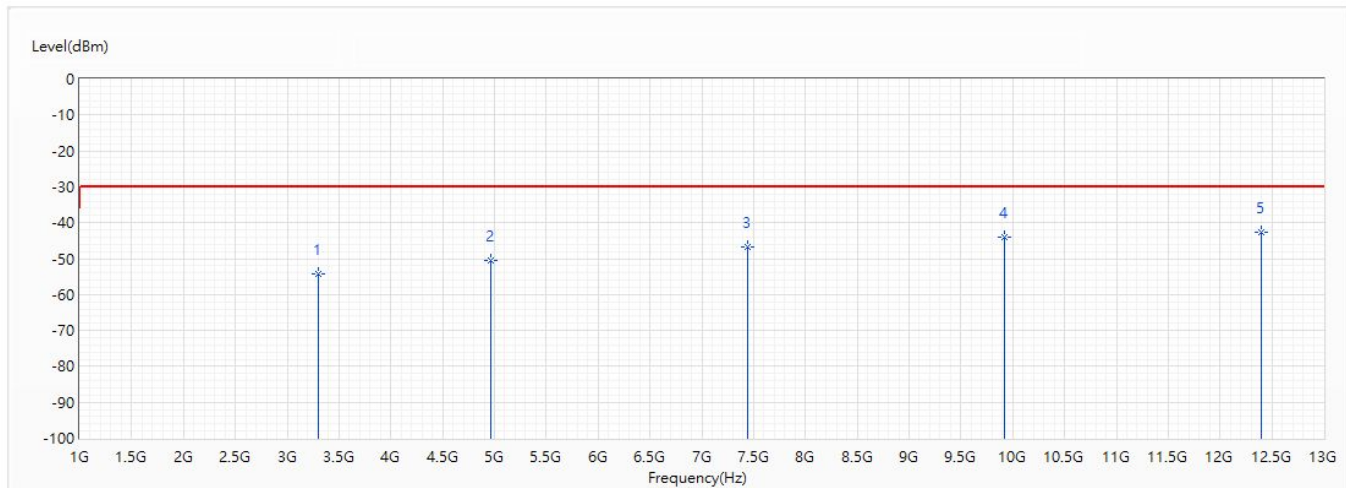


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3306.667	-54.41	-30.00	-24.41	-66.01	11.60	PK
2	4960	-50.68	-30.00	-20.68	-65.15	14.47	PK
3	7440	-47.02	-30.00	-17.02	-69.44	22.42	PK
4	9920	-44.66	-30.00	-14.66	-72.03	27.37	PK
* 5	12400	-42.04	-30.00	-12.04	-71.07	29.03	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/2
Test Mode	Mode 4: Transmit mode_ External PIFA Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2480MHz_1Mbps	Humidity (%RH)	57.0

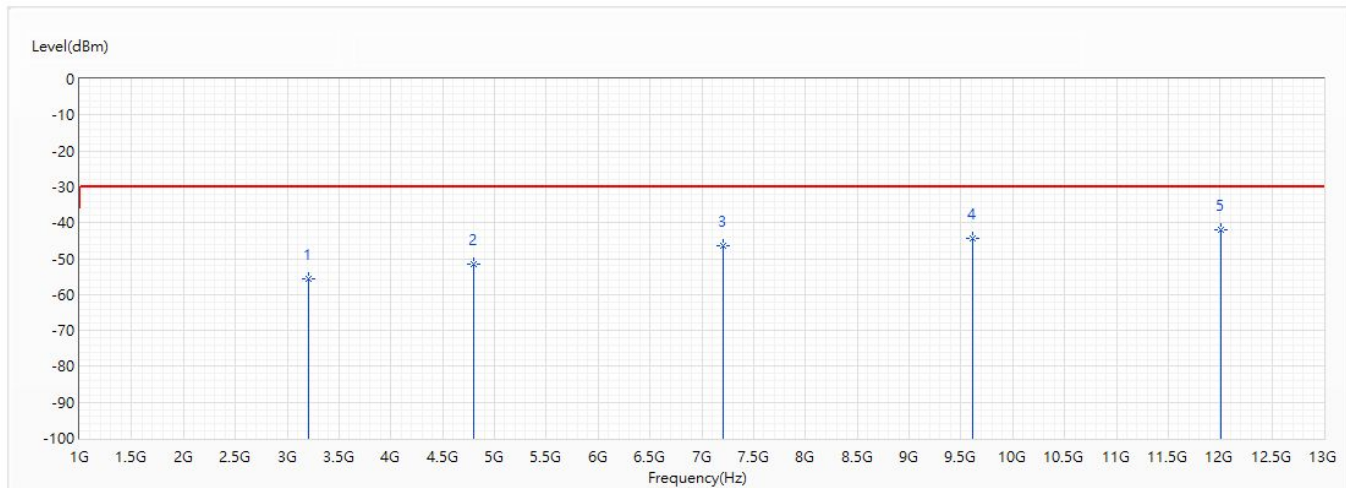


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3306.667	-54.24	-30.00	-24.24	-66.10	11.86	PK
2	4960	-50.57	-30.00	-20.57	-65.21	14.64	PK
3	7440	-46.81	-30.00	-16.81	-68.60	21.79	PK
4	9920	-43.94	-30.00	-13.94	-71.18	27.24	PK
* 5	12400	-42.71	-30.00	-12.71	-72.18	29.47	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/2
Test Mode	Mode 4: Transmit mode_ External PIFA Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2402MHz_2Mbps	Humidity (%RH)	57.0

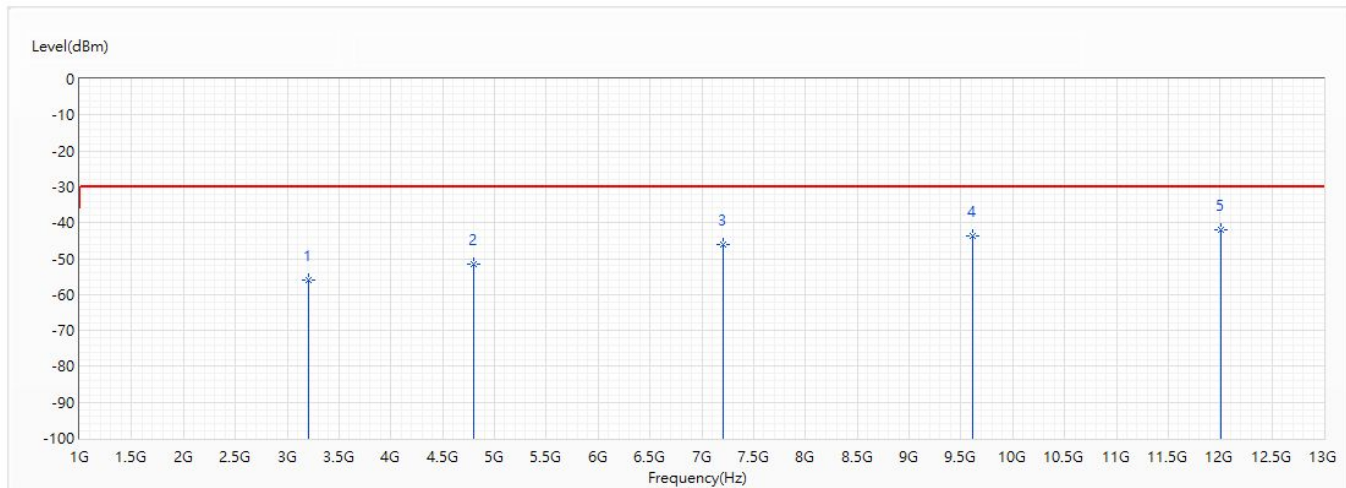


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3202.667	-55.68	-30.00	-25.68	-66.96	11.28	PK
2	4804	-51.62	-30.00	-21.62	-65.65	14.03	PK
3	7206	-46.52	-30.00	-16.52	-67.58	21.06	PK
4	9608	-44.34	-30.00	-14.34	-70.34	26.00	PK
* 5	12010	-42.00	-30.00	-12.00	-70.95	28.95	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/2
Test Mode	Mode 4: Transmit mode_ External PIFA Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2402MHz_2Mbps	Humidity (%RH)	57.0

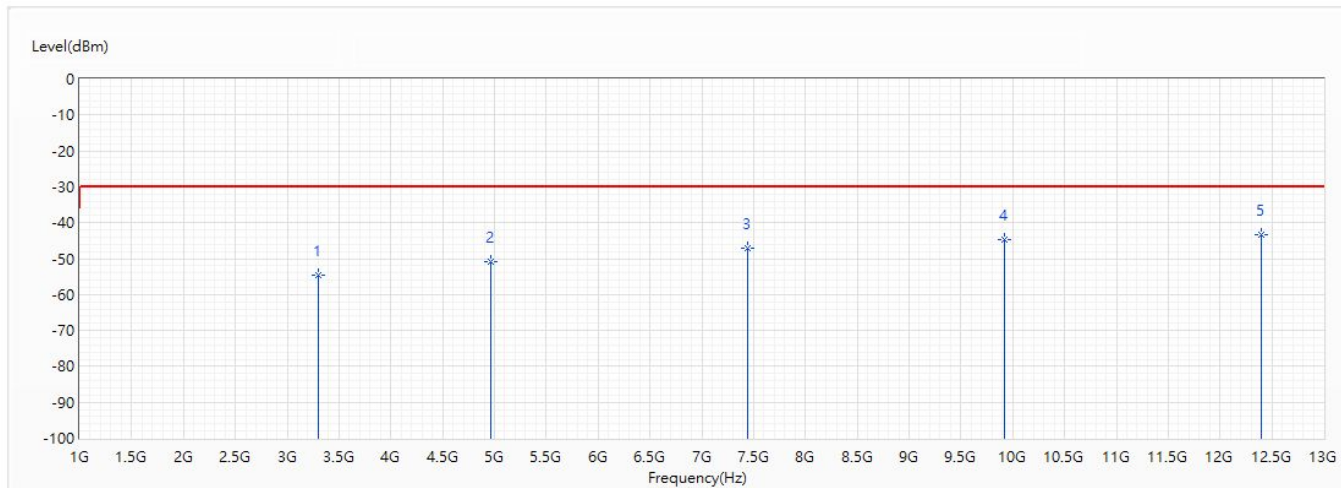


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3202.667	-55.94	-30.00	-25.94	-67.57	11.63	PK
2	4804	-51.42	-30.00	-21.42	-65.65	14.23	PK
3	7206	-46.03	-30.00	-16.03	-66.51	20.48	PK
4	9608	-43.57	-30.00	-13.57	-69.67	26.10	PK
* 5	12010	-41.84	-30.00	-11.84	-70.78	28.94	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/2
Test Mode	Mode 4: Transmit mode_ External PIFA Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2480MHz_2Mbps	Humidity (%RH)	57.0

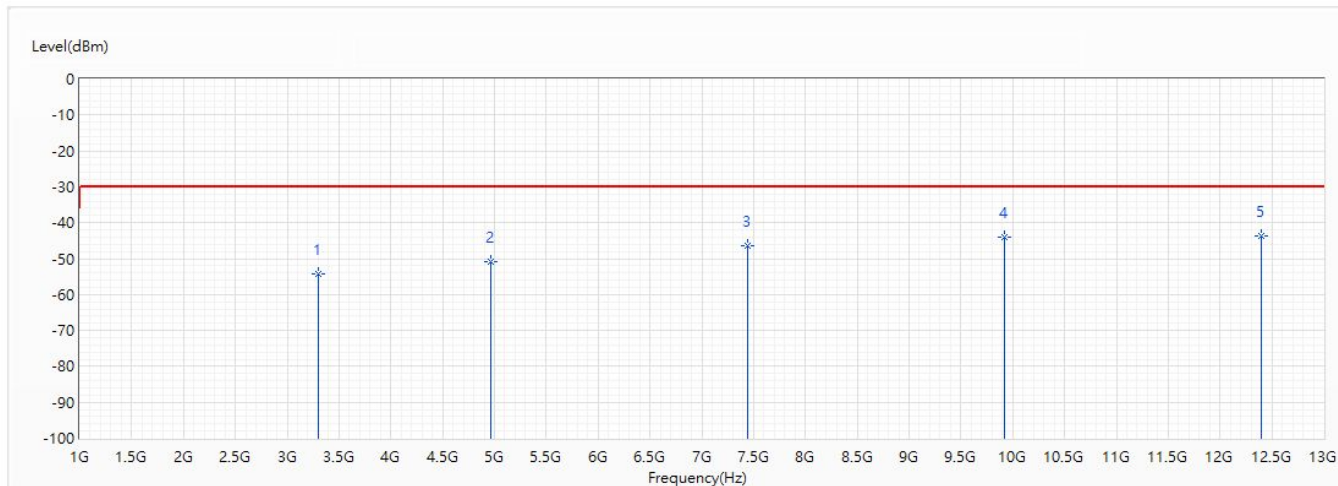


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3306.667	-54.48	-30.00	-24.48	-66.08	11.60	PK
2	4960	-50.92	-30.00	-20.92	-65.39	14.47	PK
3	7440	-47.04	-30.00	-17.04	-69.46	22.42	PK
4	9920	-44.84	-30.00	-14.84	-72.21	27.37	PK
* 5	12400	-43.45	-30.00	-13.45	-72.48	29.03	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/2
Test Mode	Mode 4: Transmit mode_ External PIFA Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2480MHz_2Mbps	Humidity (%RH)	57.0

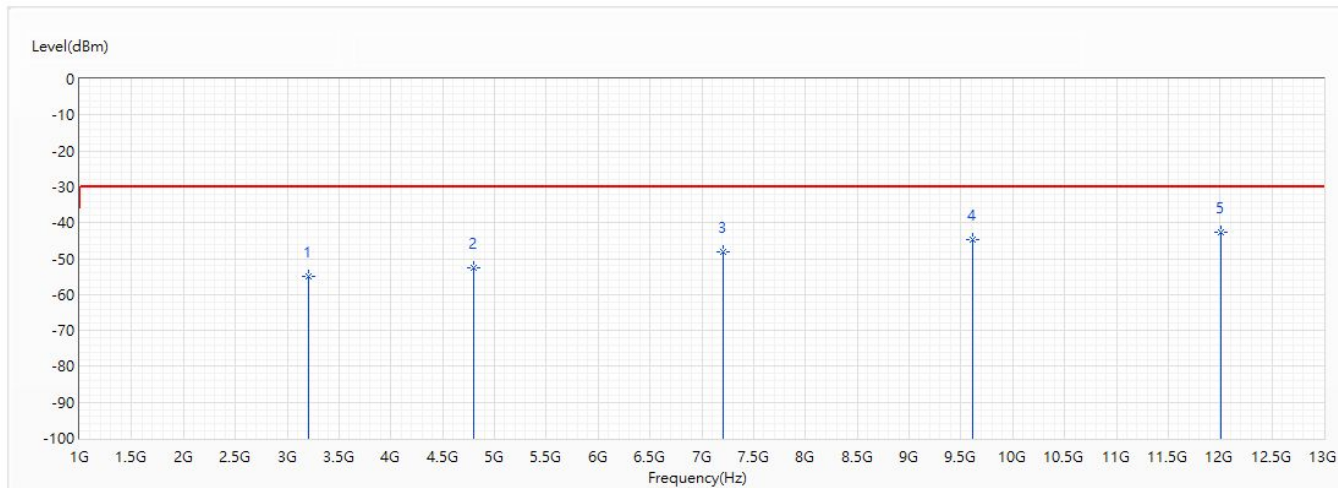


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3306.667	-54.22	-30.00	-24.22	-66.08	11.86	PK
2	4960	-51.00	-30.00	-21.00	-65.64	14.64	PK
3	7440	-46.53	-30.00	-16.53	-68.32	21.79	PK
4	9920	-44.16	-30.00	-14.16	-71.40	27.24	PK
* 5	12400	-43.63	-30.00	-13.63	-73.10	29.47	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 5: Transmit mode_ Internal PCB Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2402MHz_1Mbps	Humidity (%RH)	57.0

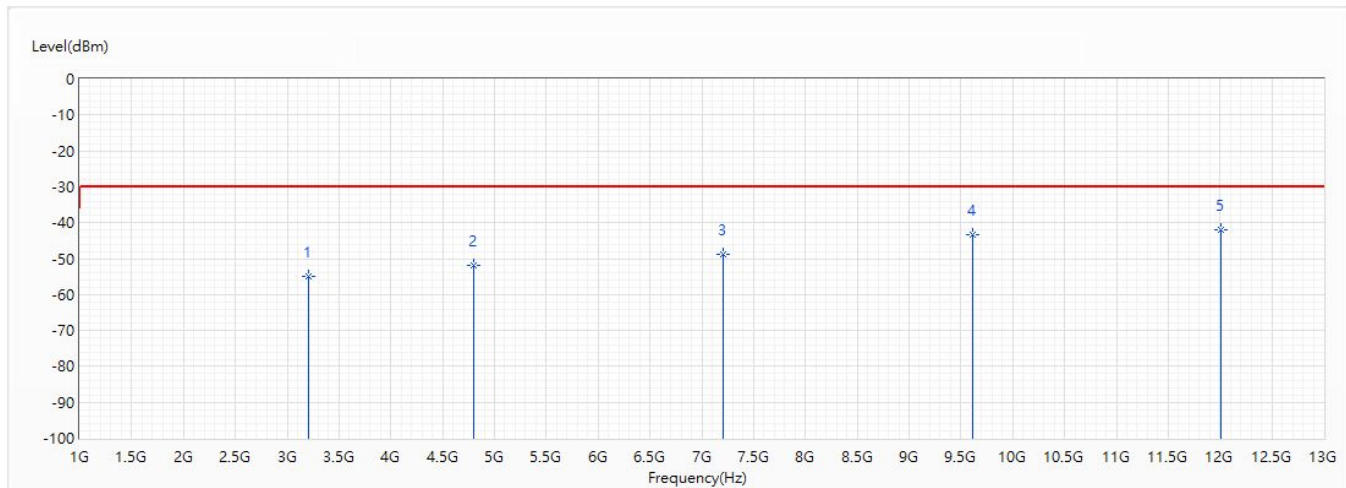


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3202.667	-54.85	-30.00	-24.85	-66.13	11.28	PK
2	4804	-52.43	-30.00	-22.43	-66.46	14.03	PK
3	7206	-47.98	-30.00	-17.98	-69.04	21.06	PK
4	9608	-44.74	-30.00	-14.74	-70.74	26.00	PK
* 5	12010	-42.68	-30.00	-12.68	-71.63	28.95	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 5: Transmit mode_ Internal PCB Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2402MHz_1Mbps	Humidity (%RH)	57.0

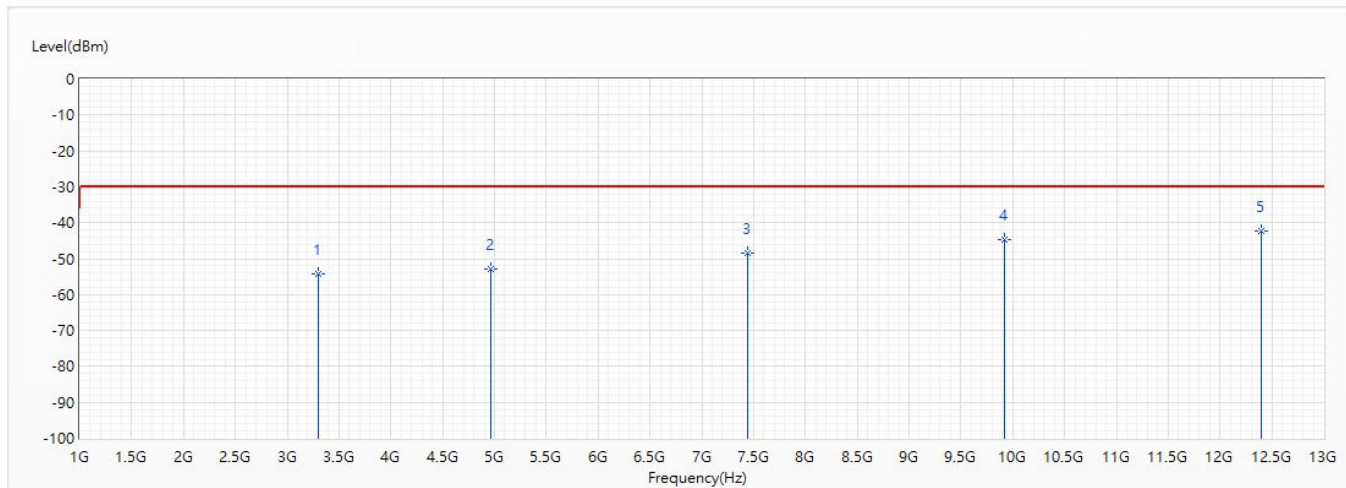


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3202.667	-54.78	-30.00	-24.78	-66.41	11.63	PK
2	4804	-51.92	-30.00	-21.92	-66.15	14.23	PK
3	7206	-48.87	-30.00	-18.87	-69.35	20.48	PK
4	9608	-43.38	-30.00	-13.38	-69.48	26.10	PK
* 5	12010	-42.13	-30.00	-12.13	-71.07	28.94	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 5: Transmit mode_ Internal PCB Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2480MHz_1Mbps	Humidity (%RH)	57.0

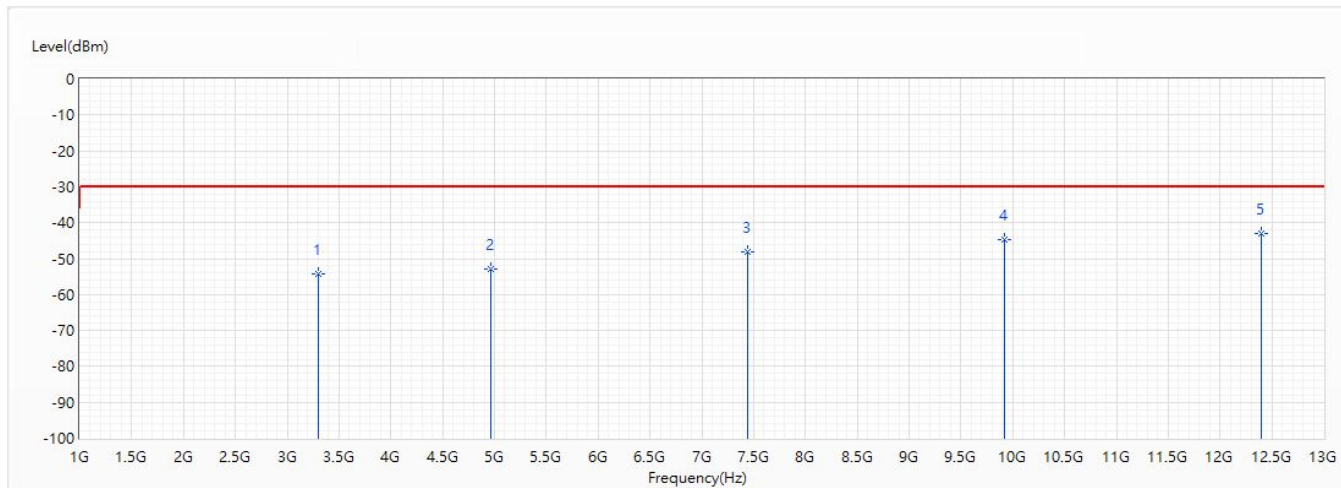


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3306.667	-54.41	-30.00	-24.41	-66.01	11.60	PK
2	4960	-52.87	-30.00	-22.87	-67.34	14.47	PK
3	7440	-48.35	-30.00	-18.35	-70.77	22.42	PK
4	9920	-44.75	-30.00	-14.75	-72.12	27.37	PK
* 5	12400	-42.23	-30.00	-12.23	-71.26	29.03	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 5: Transmit mode_ Internal PCB Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2480MHz_1Mbps	Humidity (%RH)	57.0

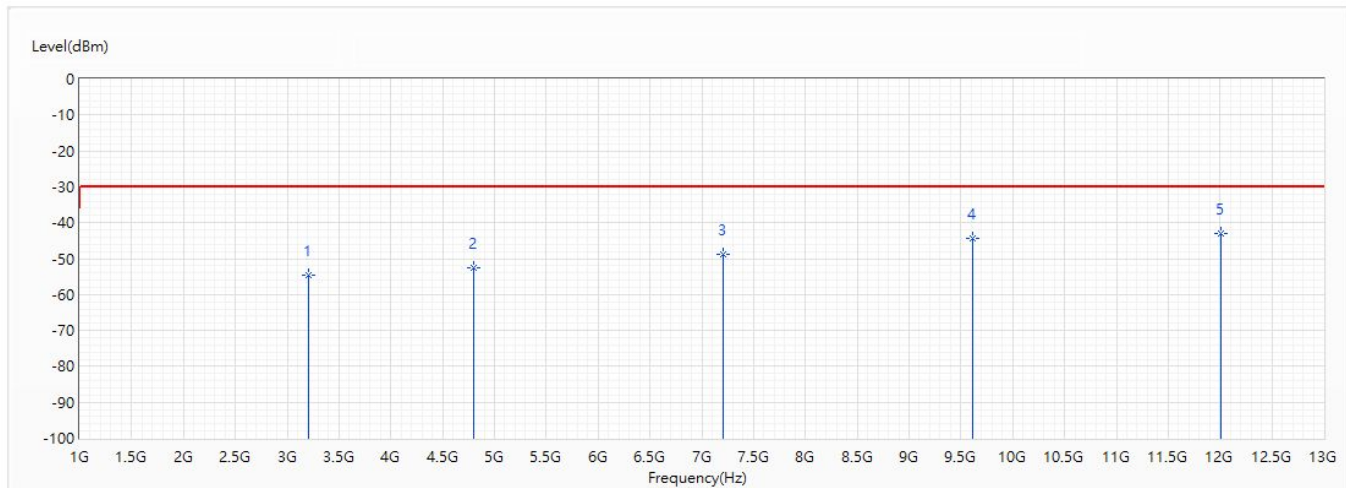


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3306.667	-54.33	-30.00	-24.33	-66.19	11.86	PK
2	4960	-52.91	-30.00	-22.91	-67.55	14.64	PK
3	7440	-48.15	-30.00	-18.15	-69.94	21.79	PK
4	9920	-44.55	-30.00	-14.55	-71.79	27.24	PK
* 5	12400	-43.14	-30.00	-13.14	-72.61	29.47	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 5: Transmit mode_ Internal PCB Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2402MHz_2Mbps	Humidity (%RH)	57.0

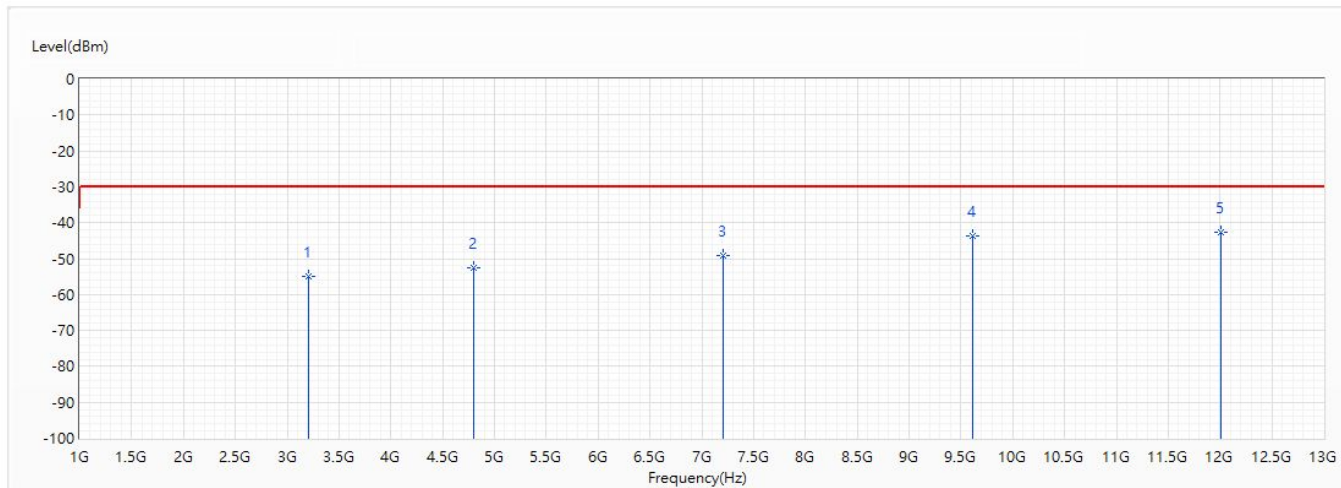


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3202.667	-54.74	-30.00	-24.74	-66.02	11.28	PK
2	4804	-52.57	-30.00	-22.57	-66.60	14.03	PK
3	7206	-48.69	-30.00	-18.69	-69.75	21.06	PK
4	9608	-44.23	-30.00	-14.23	-70.23	26.00	PK
* 5	12010	-42.84	-30.00	-12.84	-71.79	28.95	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 5: Transmit mode_ Internal PCB Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2402MHz_2Mbps	Humidity (%RH)	57.0

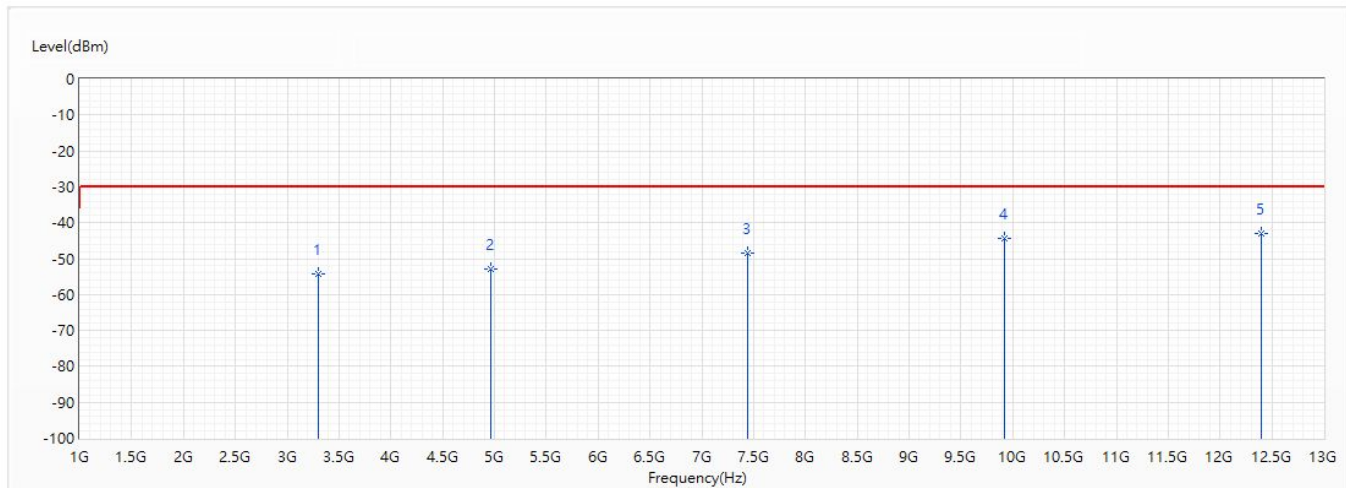


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3202.667	-54.88	-30.00	-24.88	-66.51	11.63	PK
2	4804	-52.67	-30.00	-22.67	-66.90	14.23	PK
3	7206	-49.12	-30.00	-19.12	-69.60	20.48	PK
4	9608	-43.82	-30.00	-13.82	-69.92	26.10	PK
* 5	12010	-42.75	-30.00	-12.75	-71.69	28.94	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 5: Transmit mode_ Internal PCB Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2480MHz_2Mbps	Humidity (%RH)	57.0

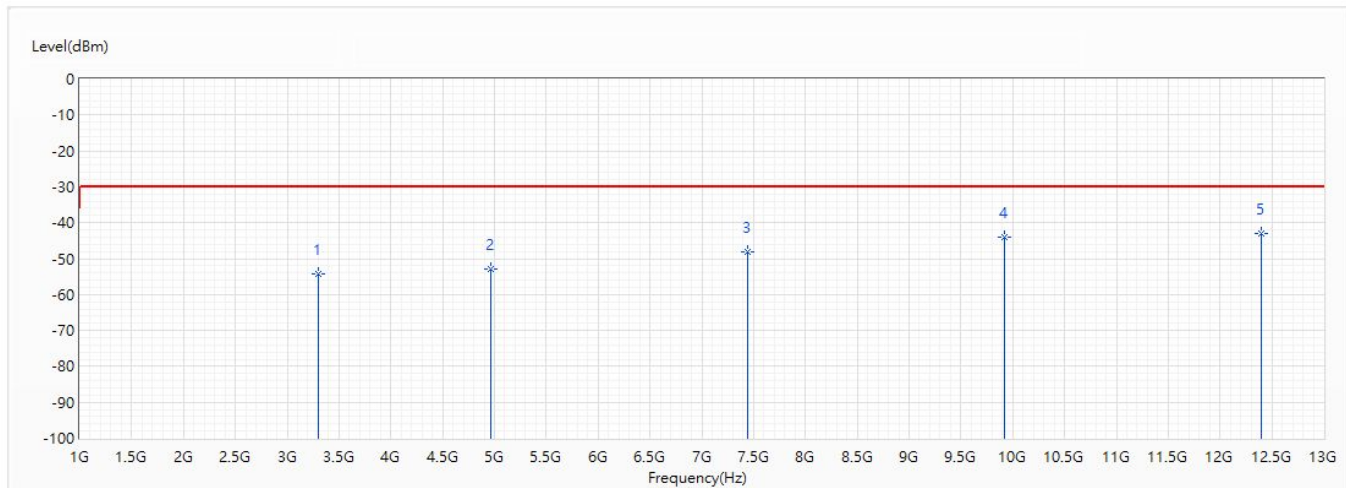


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3306.667	-54.26	-30.00	-24.26	-65.86	11.60	PK
2	4960	-52.78	-30.00	-22.78	-67.25	14.47	PK
3	7440	-48.42	-30.00	-18.42	-70.84	22.42	PK
4	9920	-44.42	-30.00	-14.42	-71.79	27.37	PK
* 5	12400	-42.99	-30.00	-12.99	-72.02	29.03	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 5: Transmit mode_ Internal PCB Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2480MHz_2Mbps	Humidity (%RH)	57.0



No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3306.667	-54.20	-30.00	-24.20	-66.06	11.86	PK
2	4960	-52.86	-30.00	-22.86	-67.50	14.64	PK
3	7440	-48.19	-30.00	-18.19	-69.98	21.79	PK
4	9920	-44.01	-30.00	-14.01	-71.25	27.24	PK
* 5	12400	-43.13	-30.00	-13.13	-72.60	29.47	PK

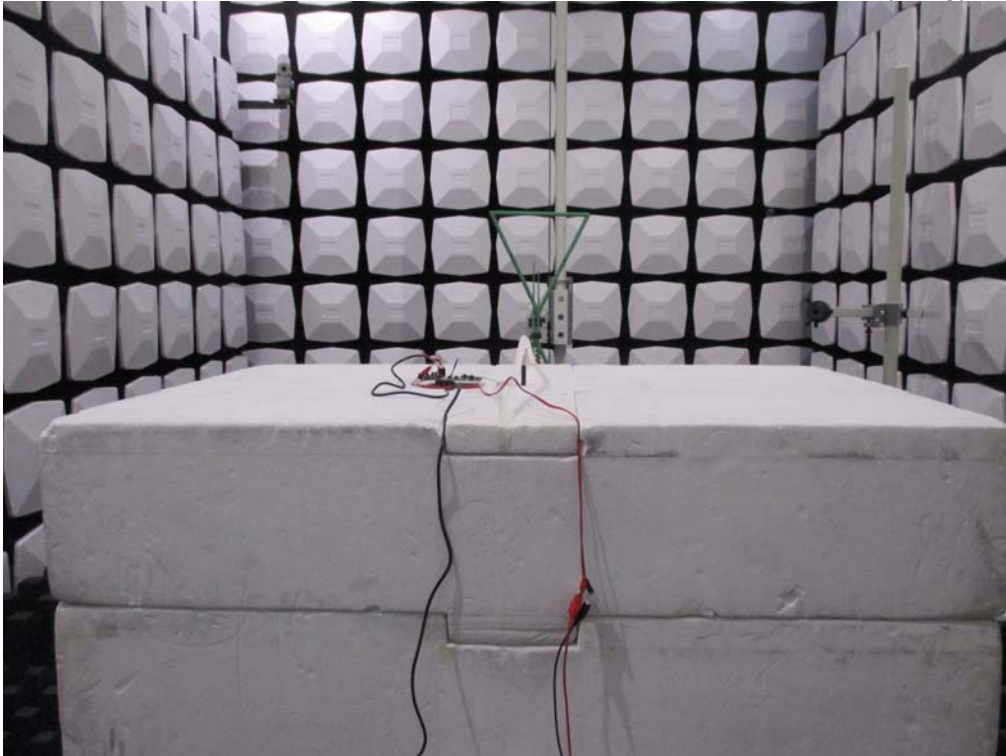
Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

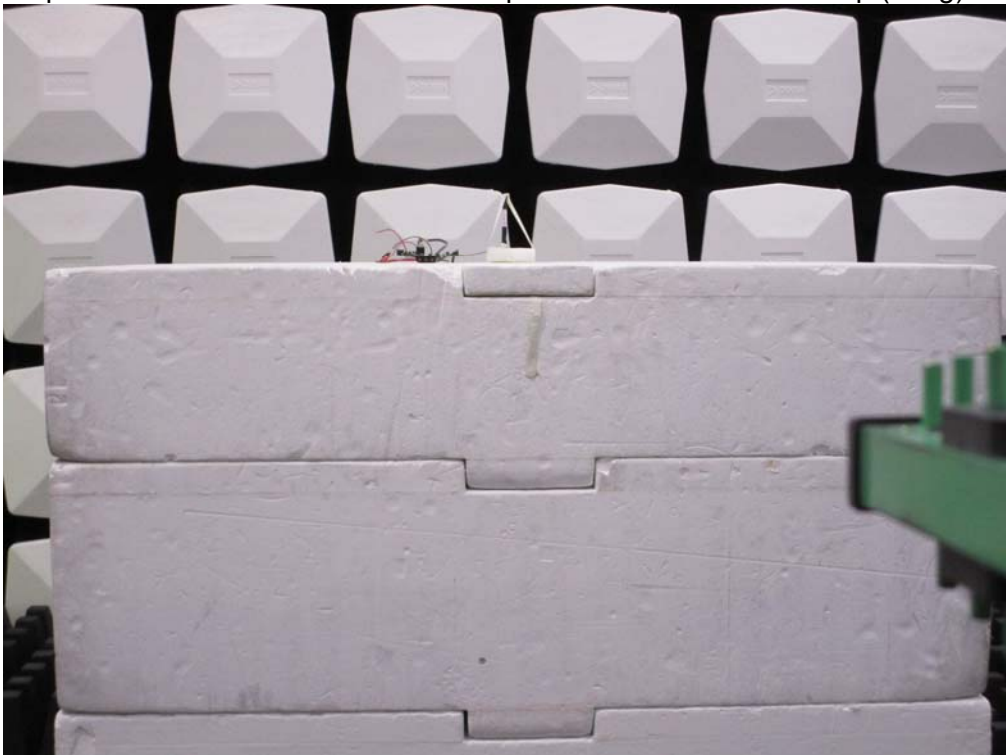
6.7. Test Photo

Test Mode : Mode 1: Transmit Mode_External Dipole Ant._High Power

Description : Front View of Transmitter spurious emission Test Setup (Bilog)

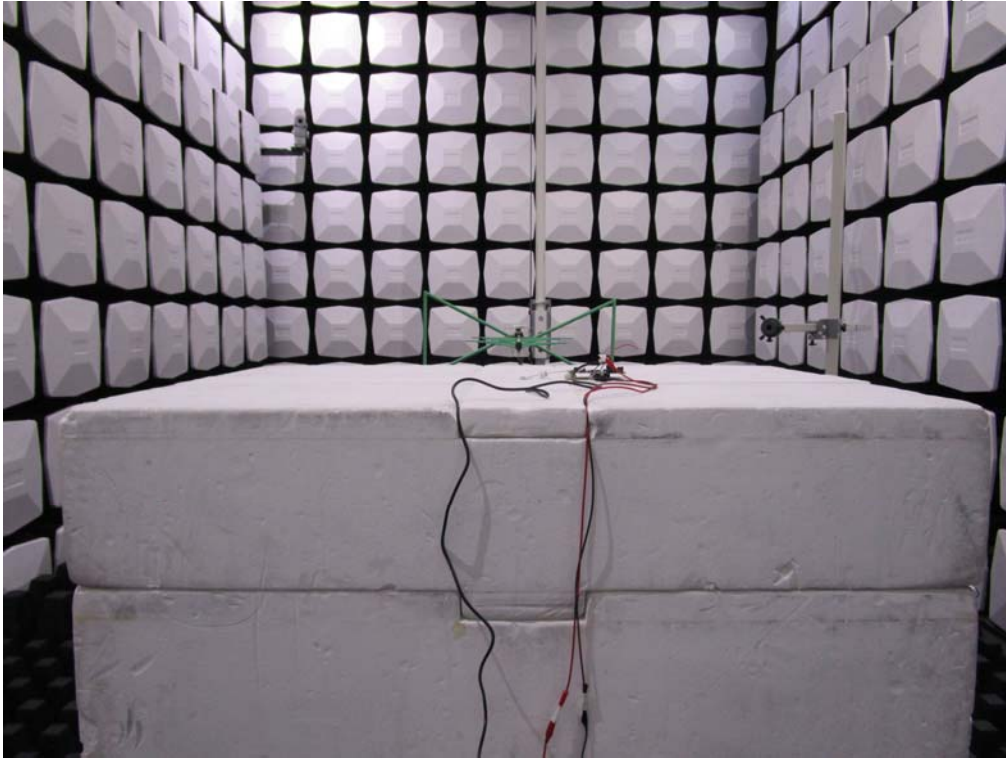


Description : Back View of Transmitter spurious emission Test Setup (Bilog)



Test Mode : Mode 3: Transmit mode_External PCB Ant.

Description : Front View of Transmitter spurious emission Test Setup (Bilog)



Description : Back View of Transmitter spurious emission Test Setup (Bilog)

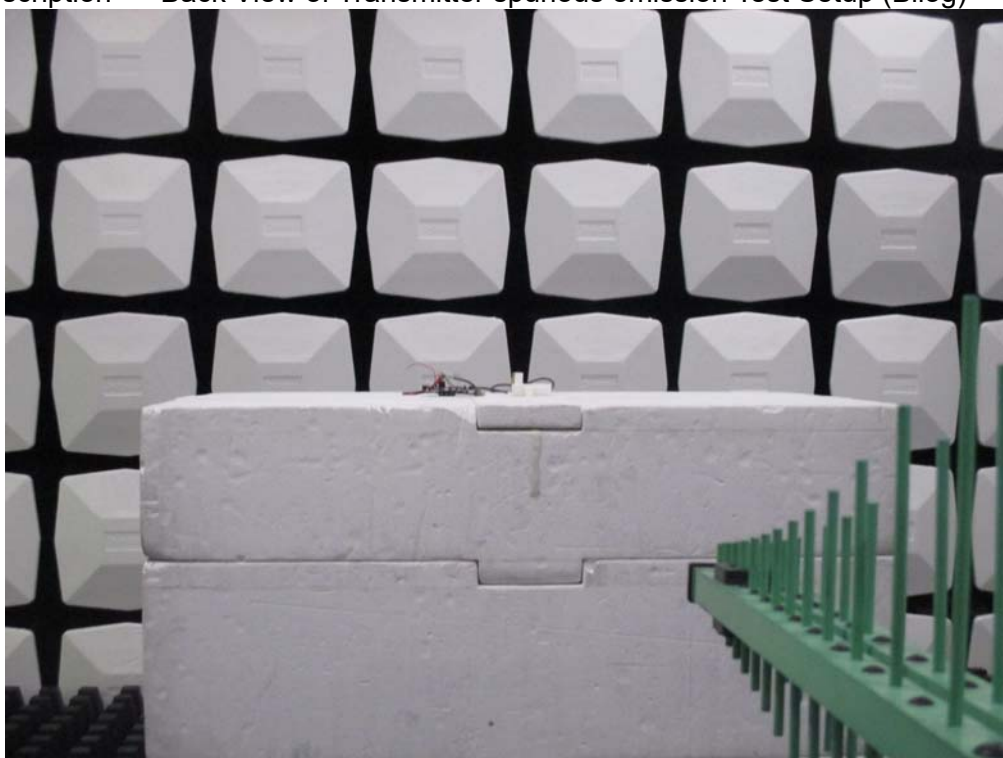


Test Mode : Mode 4: Transmit mode_External PIFA Ant.

Description : Front View of Transmitter spurious emission Test Setup (Bilog)

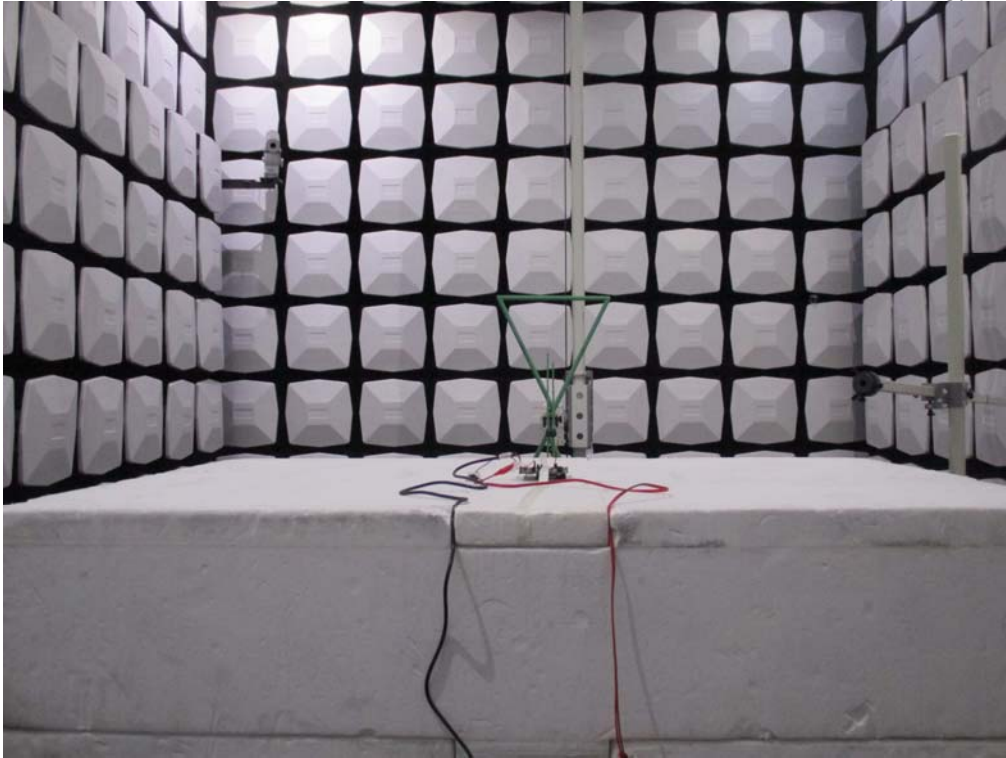


Description : Back View of Transmitter spurious emission Test Setup (Bilog)

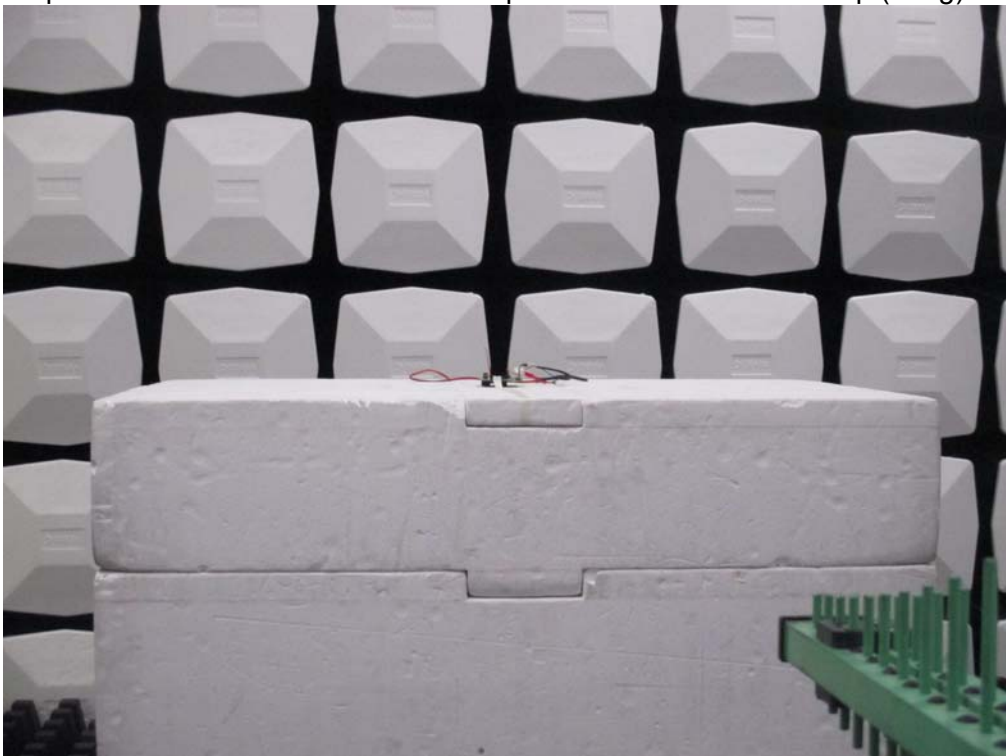


Test Mode : Mode 5: Transmit mode_Internal PCB Ant.

Description : Front View of Transmitter spurious emission Test Setup (Bilog)

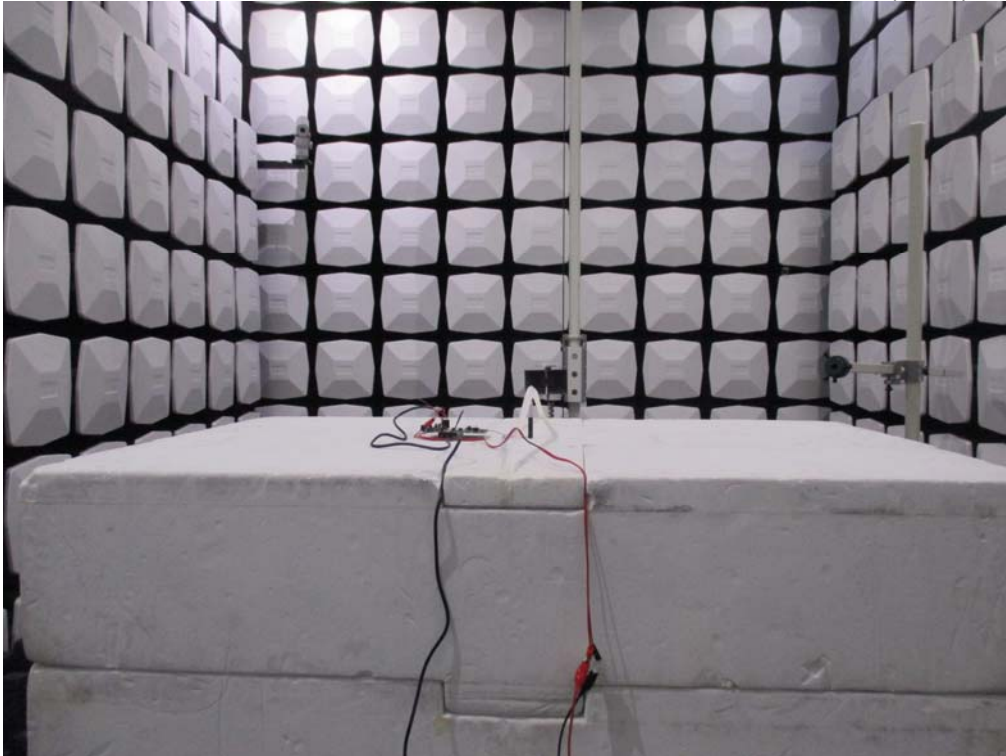


Description : Back View of Transmitter spurious emission Test Setup (Bilog)



Test Mode : Mode 1: Transmit Mode_External Dipole Ant._High Power

Description : Front View of Transmitter spurious emission Test Setup (Horn)

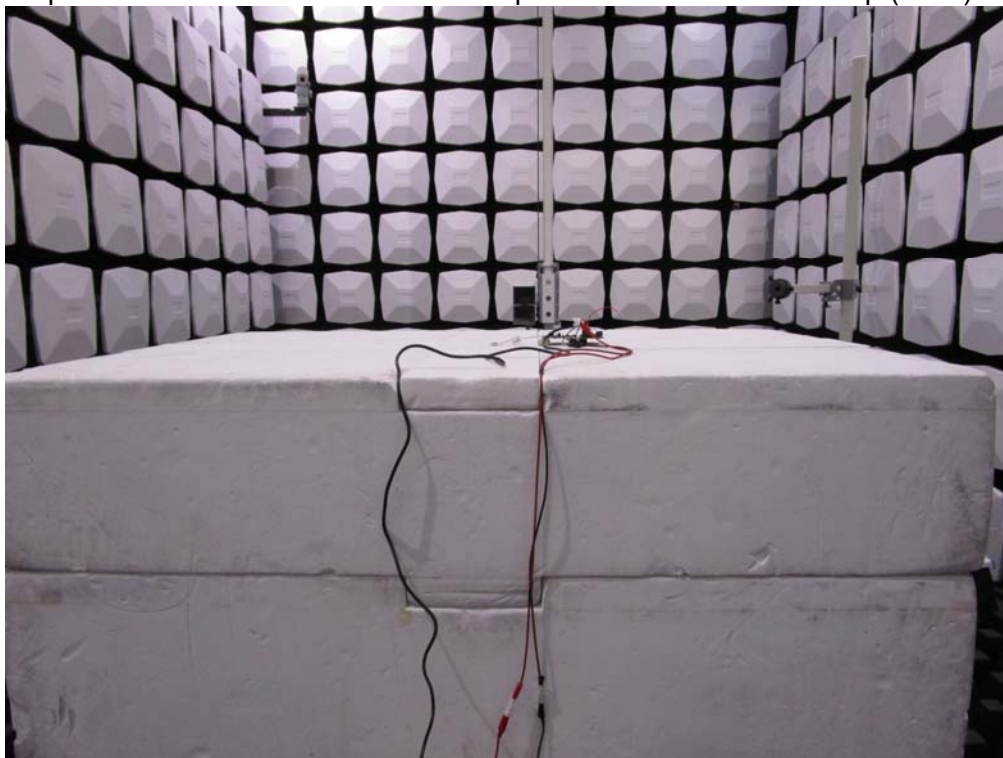


Description : Back View of Transmitter spurious emission Test Setup (Horn)



Test Mode : Mode 3: Transmit mode_External PCB Ant.

Description : Front View of Transmitter spurious emission Test Setup (Horn)

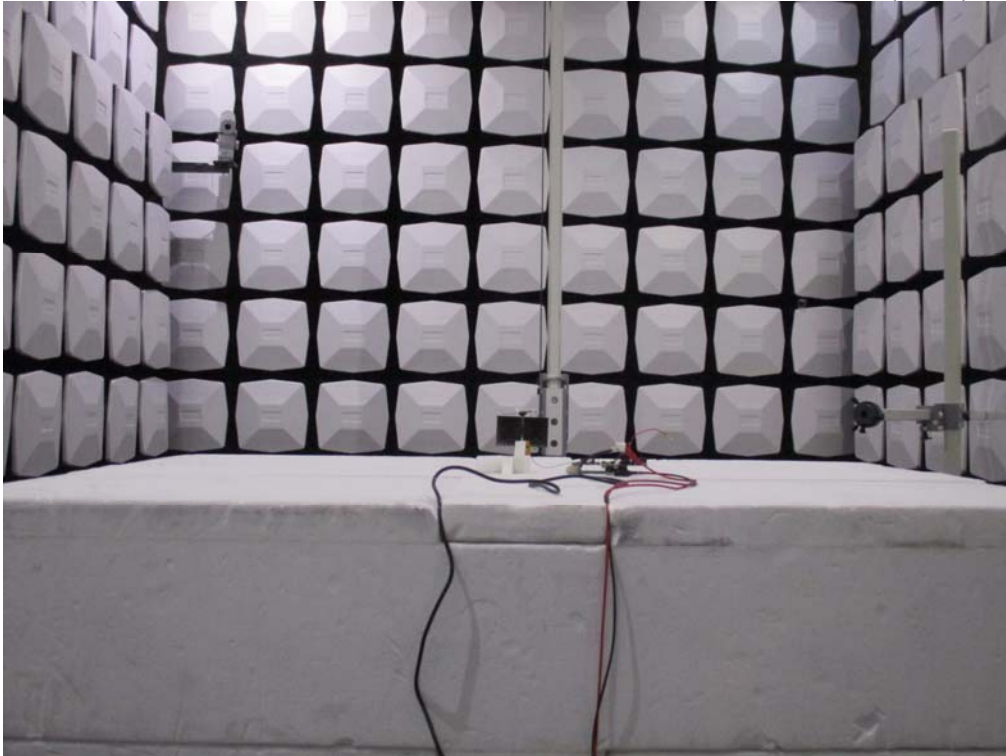


Description : Back View of Transmitter spurious emission Test Setup (Horn)



Test Mode : Mode 4: Transmit mode_External PIFA Ant.

Description : Front View of Transmitter spurious emission Test Setup (Horn)

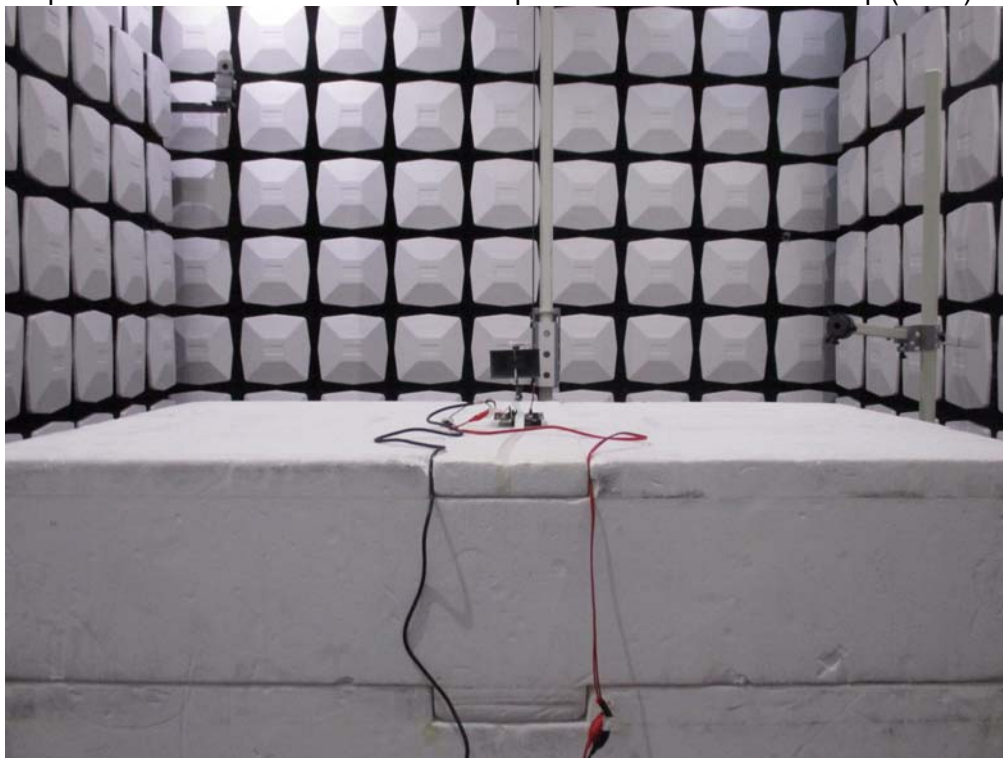


Description : Back View of Transmitter spurious emission Test Setup (Horn)



Test Mode : Mode 5: Transmit mode_Internal PCB Ant.

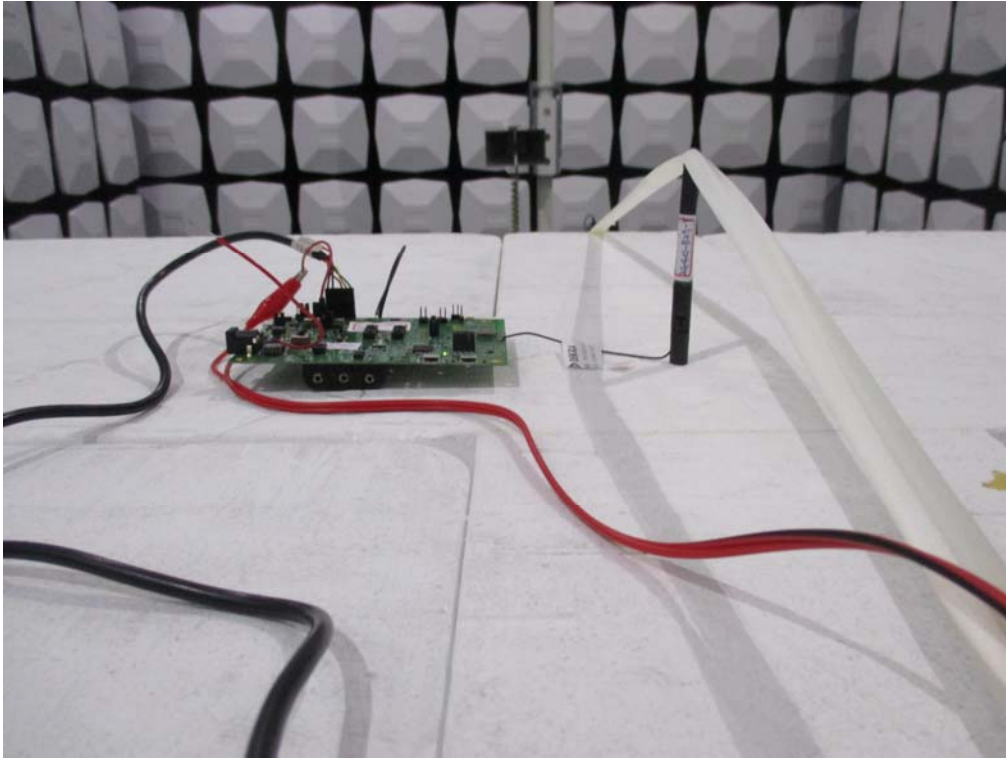
Description : Front View of Transmitter spurious emission Test Setup (Horn)



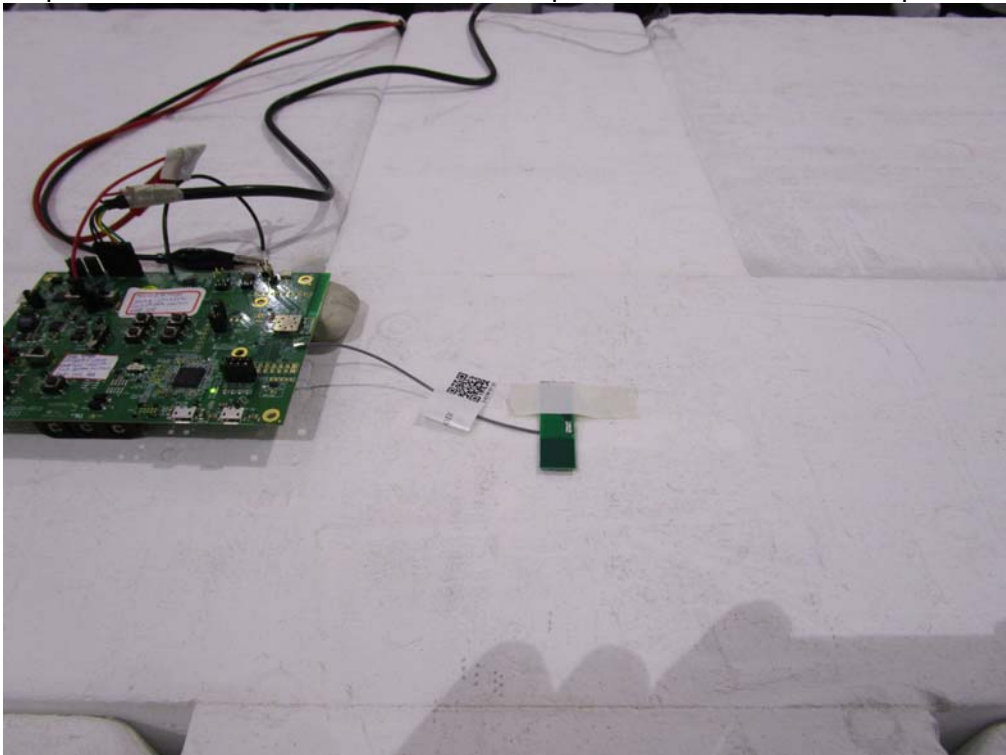
Description : Back View of Transmitter spurious emission Test Setup (Horn)



Test Mode : Mode 1: Transmit Mode_External Dipole Ant._High Power
Description : Detailed View of Transmitter spurious emission Test Setup

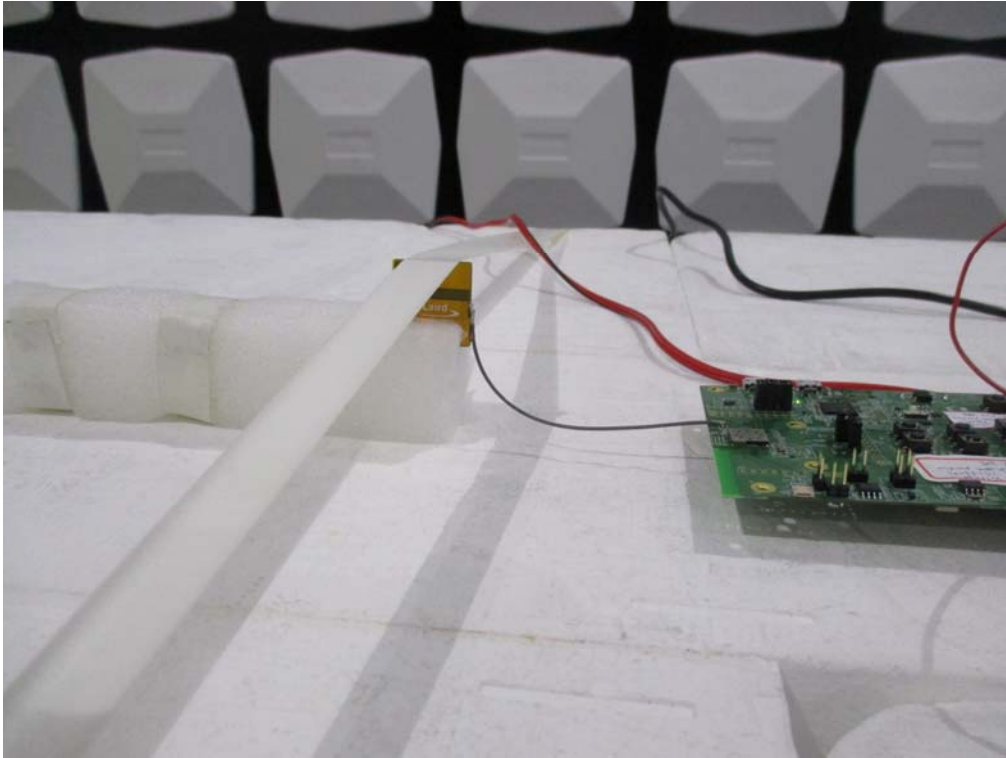


Test Mode : Mode 3: Transmit mode_External PCB Ant.
Description : Detailed View of Transmitter spurious emission Test Setup



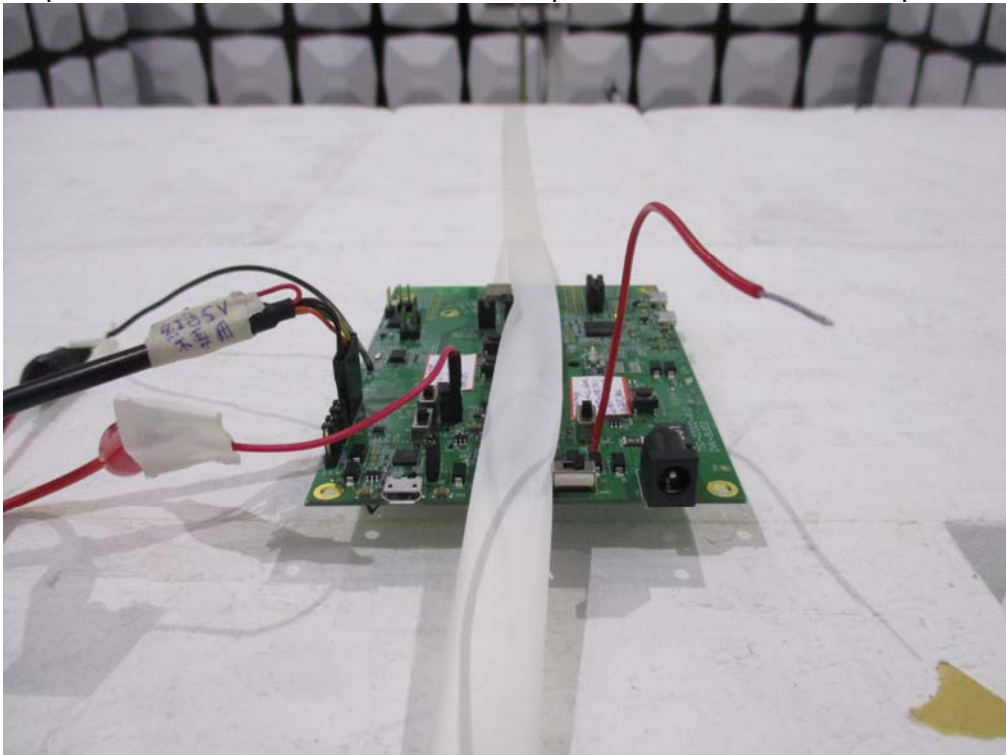
Test Mode : Mode 4: Transmit mode_External PIFA Ant.

Description : Detailed View of Transmitter spurious emission Test Setup



Test Mode : Mode 5: Transmit mode_Internal PCB Ant.

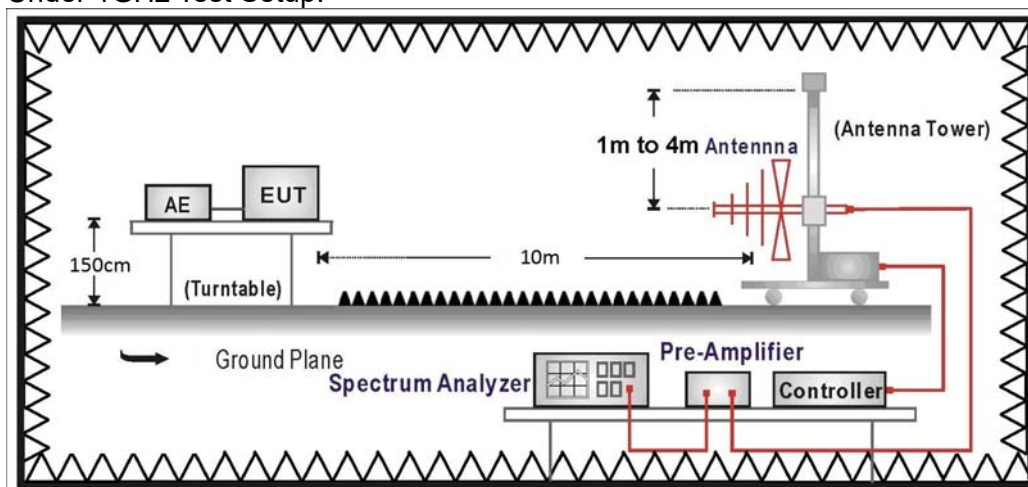
Description : Detailed View of Transmitter spurious emission Test Setup



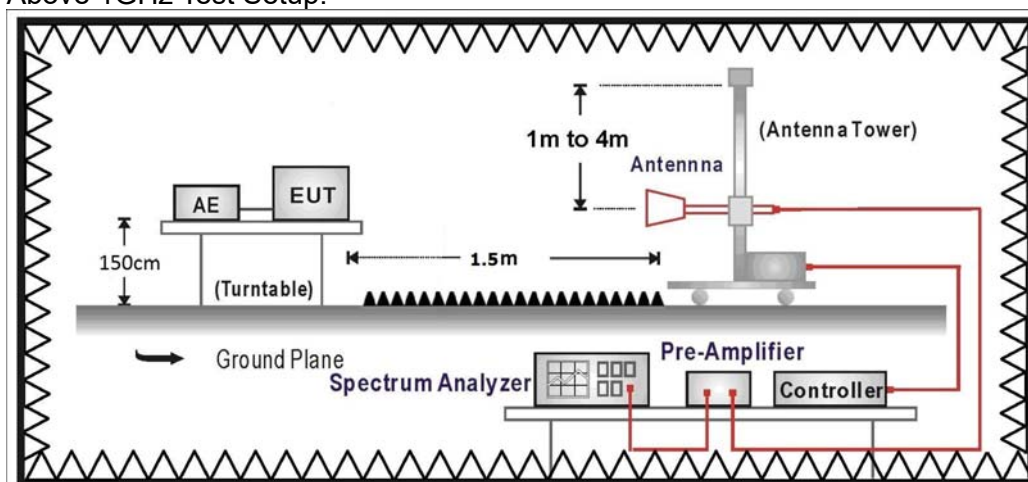
7. Receiver spurious emission

7.1. Test Setup

Under 1GHz Test Setup:



Above 1GHz Test Setup:



7.2. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

7.3. Limits

Frequency range	Maximum power	Measurement bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12,75 GHz	-47 dBm	1 MHz

7.4. Test Procedure

The EUT and its test fixture are placed on a turn table which is 1.5 meters above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 1.5 or 10 meters. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. And a high frequency preamplifier were used increase the sensitivity of the measuring. In order to find the maximum emission, all of the interface cables must be manipulated according to ETSI EN 300 328 V2.2.2 (2019-07) on radiated measurement.

The additional notch filter below 1GHz was used to measure the level of harmonics radiated emission during field strength of harmonics measurement. The bandwidth below 1GHz setting on the field strength meter is 100 kHz, and 1MHz bandwidth is adpted above 1GHz. The frequency range from 30MHz to 12.75GHz is checked.

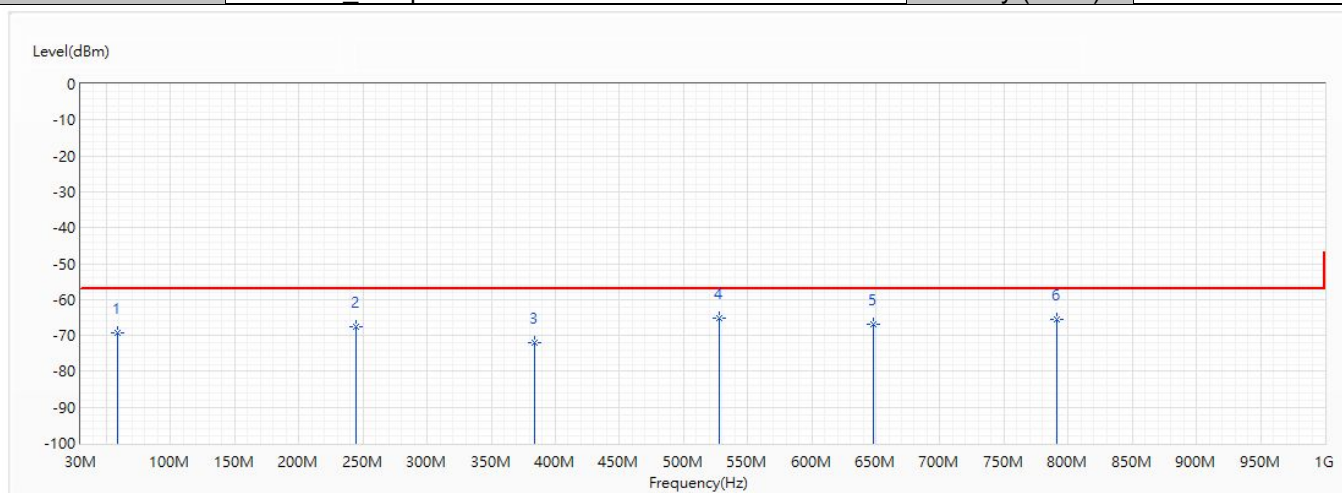
7.5. Test Specification

According to ETSI EN 300 328 V2.2.2 (2019-07)

7.6. Test Result

30 MHz-1GHz Spurious:

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/2
Test Mode	Mode 6: Receive Mode_ External Dipole Ant.	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2440MHz_ 1Mbps	Humidity (%RH)	57.0

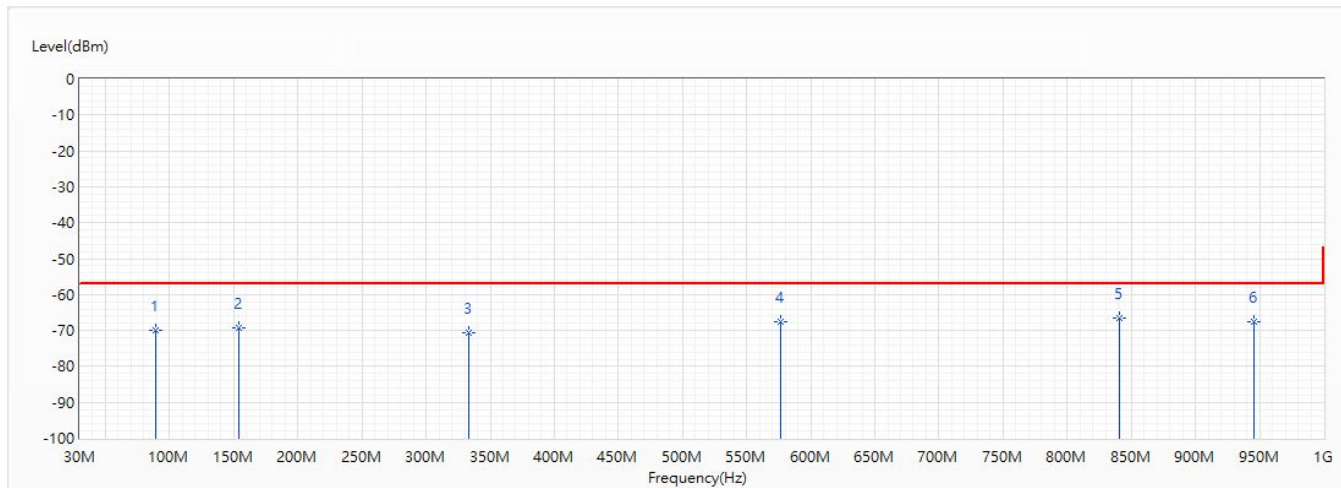


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	59.003	-69.27	-57.00	-12.27	-56.22	-13.05	PK
2	244.661	-67.50	-57.00	-10.50	-58.42	-9.08	PK
3	384.05	-72.17	-57.00	-15.17	-66.91	-5.26	PK
* 4	527.998	-65.10	-57.00	-8.10	-63.35	-1.75	PK
5	648.181	-67.01	-57.00	-10.01	-66.44	-0.57	PK
6	791.547	-65.59	-57.00	-8.59	-65.99	0.40	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/2
Test Mode	Mode 6: Receive Mode_ External Dipole Ant.	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2440MHz_1Mbps	Humidity (%RH)	57.0

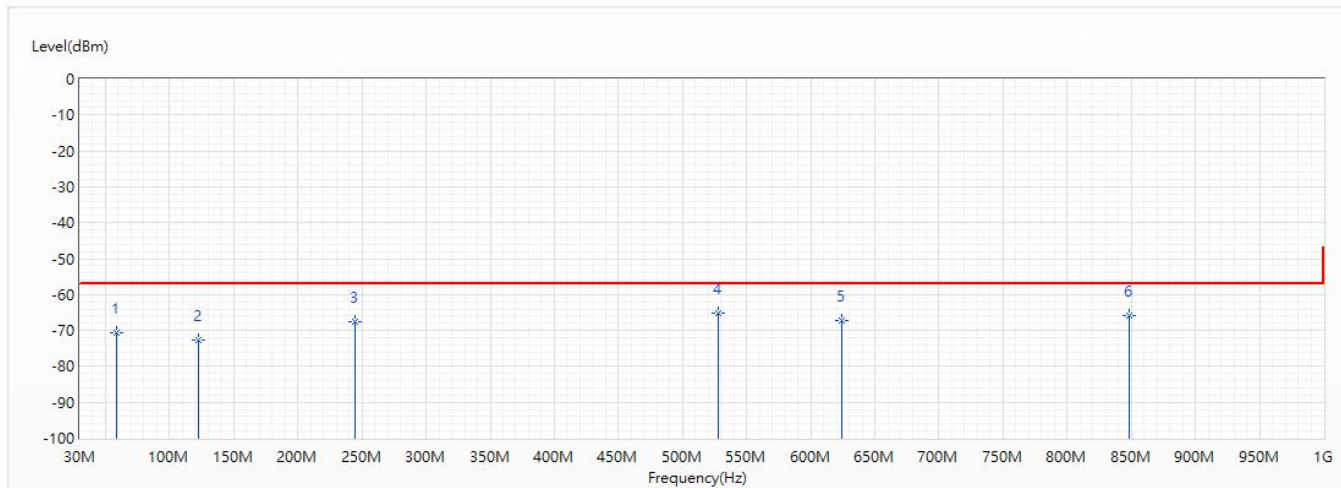


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	89.073	-69.91	-57.00	-12.91	-60.24	-9.67	PK
2	153.675	-69.30	-57.00	-12.30	-58.61	-10.69	PK
3	333.319	-70.77	-57.00	-13.77	-63.78	-6.99	PK
4	576.11	-67.47	-57.00	-10.47	-66.26	-1.21	PK
* 5	840.435	-66.57	-57.00	-9.57	-66.92	0.35	PK
6	945.68	-67.48	-57.00	-10.48	-68.23	0.75	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/2
Test Mode	Mode 6: Receive Mode_ External Dipole Ant.	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2440MHz_2Mbps	Humidity (%RH)	57.0

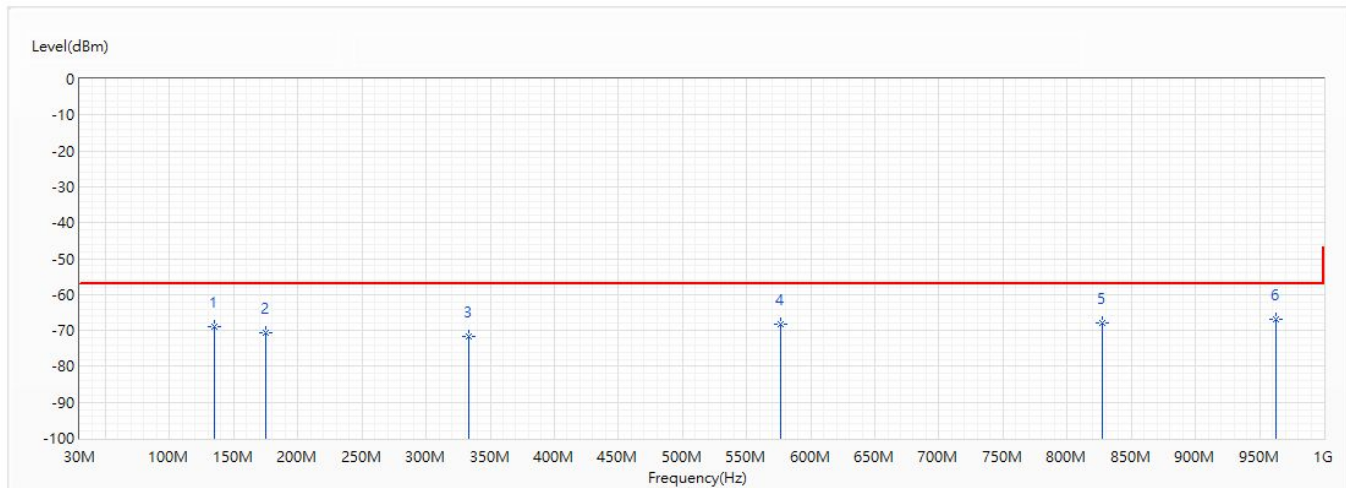


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	58.906	-70.76	-57.00	-13.76	-57.73	-13.03	PK
2	122.926	-72.54	-57.00	-15.54	-64.33	-8.21	PK
3	244.661	-67.45	-57.00	-10.45	-58.37	-9.08	PK
* 4	528.192	-65.10	-57.00	-8.10	-63.35	-1.75	PK
5	624.319	-67.22	-57.00	-10.22	-65.95	-1.27	PK
6	848.583	-66.02	-57.00	-9.02	-67.04	1.02	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/2
Test Mode	Mode 6: Receive Mode_ External Dipole Ant.	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2440MHz_2Mbps	Humidity (%RH)	57.0

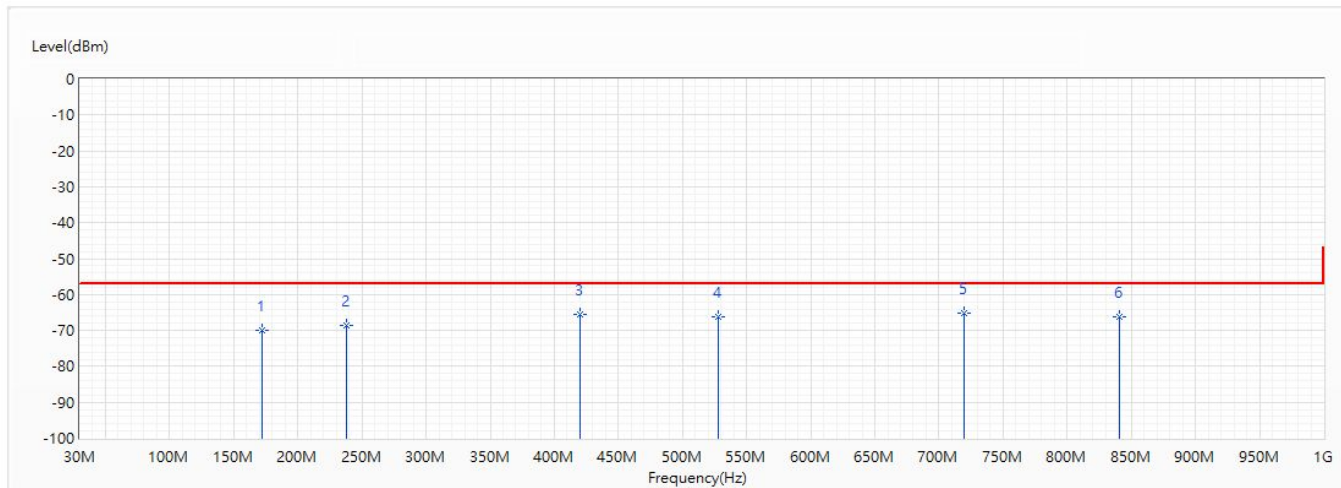


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	135.148	-68.82	-57.00	-11.82	-61.30	-7.52	PK
2	175.403	-70.75	-57.00	-13.75	-59.65	-11.10	PK
3	333.319	-71.78	-57.00	-14.78	-64.79	-6.99	PK
4	576.304	-68.21	-57.00	-11.21	-67.00	-1.21	PK
5	827.728	-67.99	-57.00	-10.99	-68.21	0.22	PK
* 6	962.752	-66.99	-57.00	-9.99	-67.83	0.84	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 7: Receive Mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2440MHz_1Mbps	Humidity (%RH)	57.0

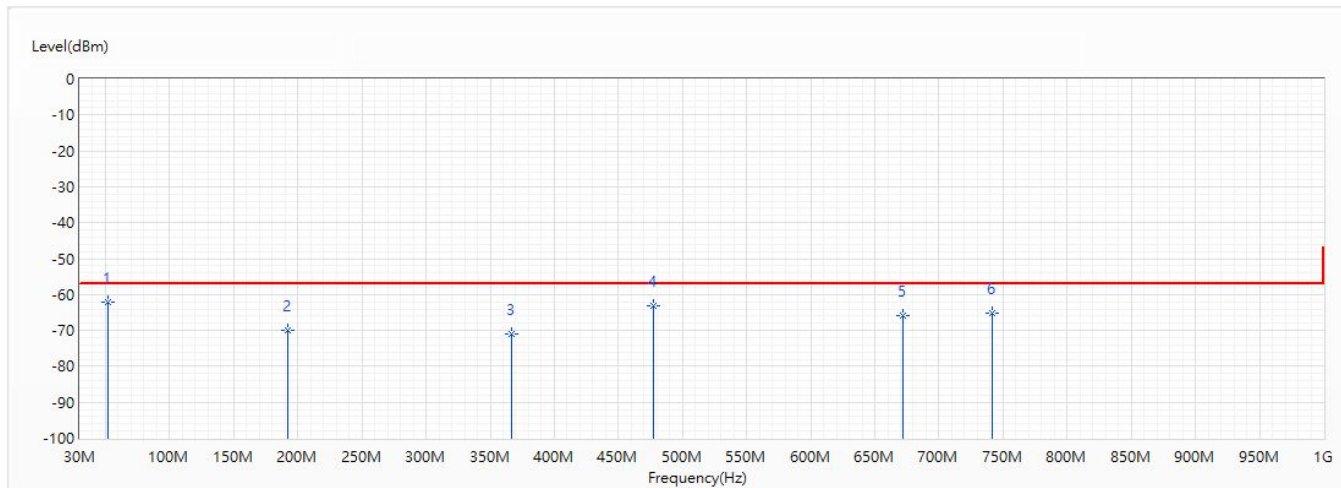


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	172.008	-69.83	-57.00	-12.83	-58.90	-10.93	PK
2	237.677	-68.71	-57.00	-11.71	-59.08	-9.63	PK
3	420.037	-65.65	-57.00	-8.65	-61.38	-4.27	PK
4	527.998	-66.17	-57.00	-9.17	-64.42	-1.75	PK
* 5	720.058	-65.20	-57.00	-8.20	-65.14	-0.06	PK
6	840.823	-66.17	-57.00	-9.17	-67.09	0.92	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 7: Receive Mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2440MHz_1Mbps	Humidity (%RH)	57.0

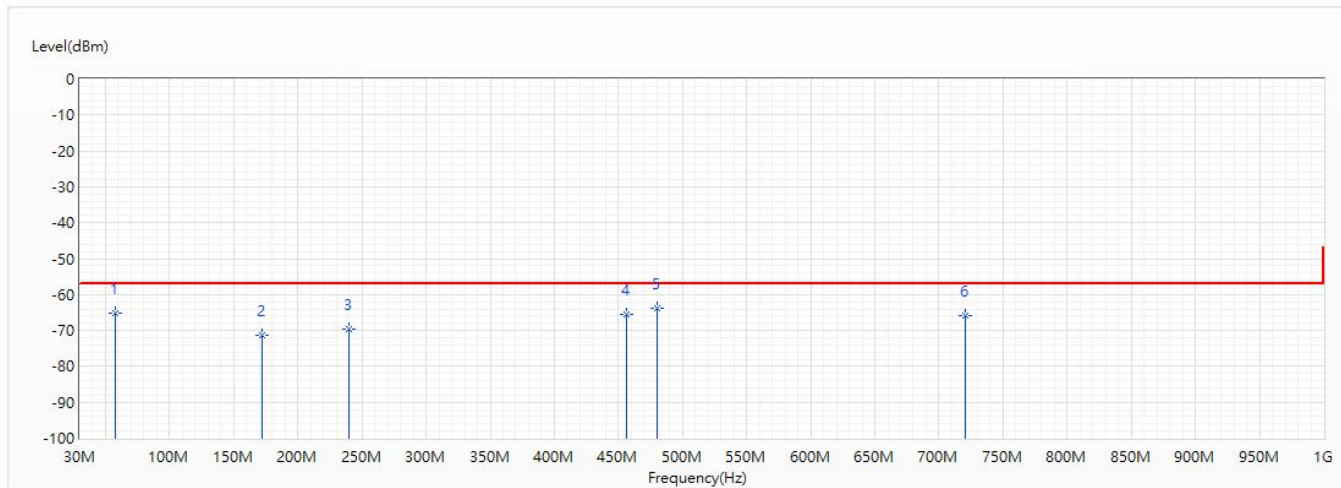


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
* 1	51.534	-62.04	-57.00	-5.04	-51.37	-10.67	PK
2	191.99	-70.04	-57.00	-13.04	-58.98	-11.06	PK
3	366.59	-70.93	-57.00	-13.93	-64.96	-5.97	PK
4	477.752	-63.21	-57.00	-6.21	-60.02	-3.19	PK
5	672.14	-65.97	-57.00	-8.97	-65.03	-0.94	PK
6	741.398	-65.25	-57.00	-8.25	-65.51	0.26	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 7: Receive Mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2440MHz_2Mbps	Humidity (%RH)	57.0

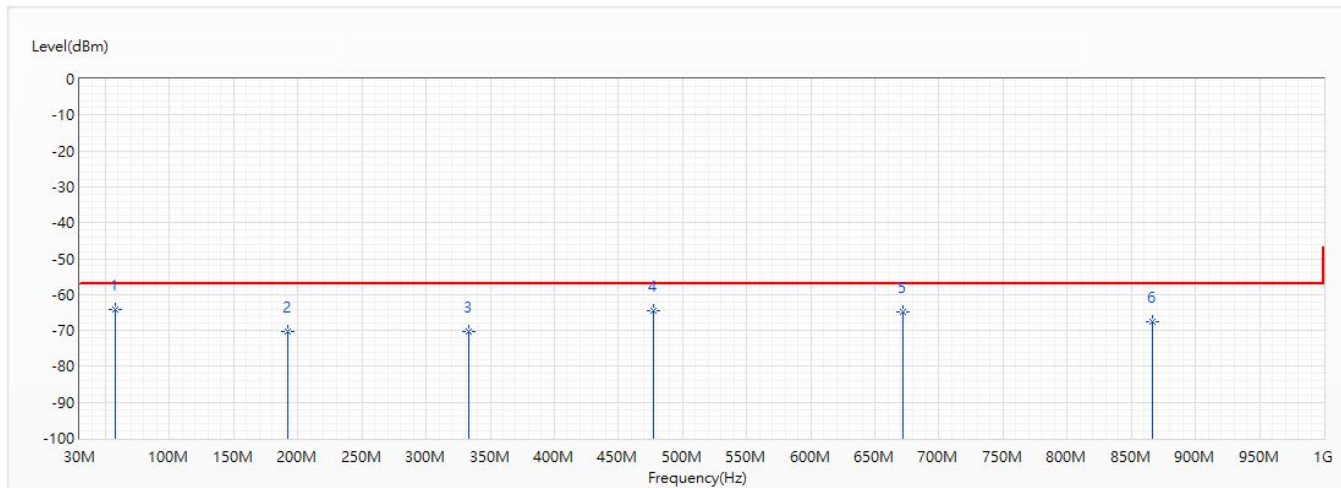


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	57.257	-65.33	-57.00	-8.33	-52.54	-12.79	PK
2	172.008	-71.27	-57.00	-14.27	-60.34	-10.93	PK
3	240.005	-69.46	-57.00	-12.46	-60.01	-9.45	PK
4	456.218	-65.36	-57.00	-8.36	-61.97	-3.39	PK
* 5	480.08	-63.99	-57.00	-6.99	-61.37	-2.62	PK
6	720.252	-65.81	-57.00	-8.81	-65.75	-0.06	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 7: Receive Mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2440MHz_2Mbps	Humidity (%RH)	57.0

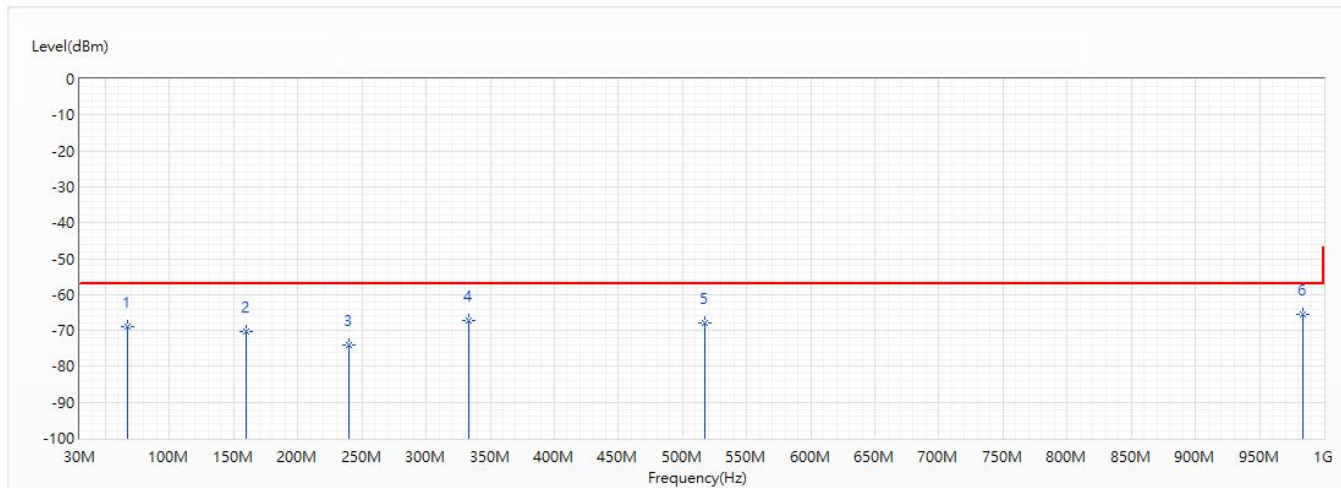


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
* 1	57.257	-64.31	-57.00	-7.31	-51.65	-12.66	PK
2	192.087	-70.22	-57.00	-13.22	-59.16	-11.06	PK
3	333.222	-70.24	-57.00	-13.24	-63.25	-6.99	PK
4	477.752	-64.54	-57.00	-7.54	-61.35	-3.19	PK
5	672.334	-64.86	-57.00	-7.86	-63.92	-0.94	PK
6	866.722	-67.42	-57.00	-10.42	-67.80	0.38	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/7
Test Mode	Mode 8: Receive Mode_ External PIFA Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2440MHz_1Mbps	Humidity (%RH)	57.0

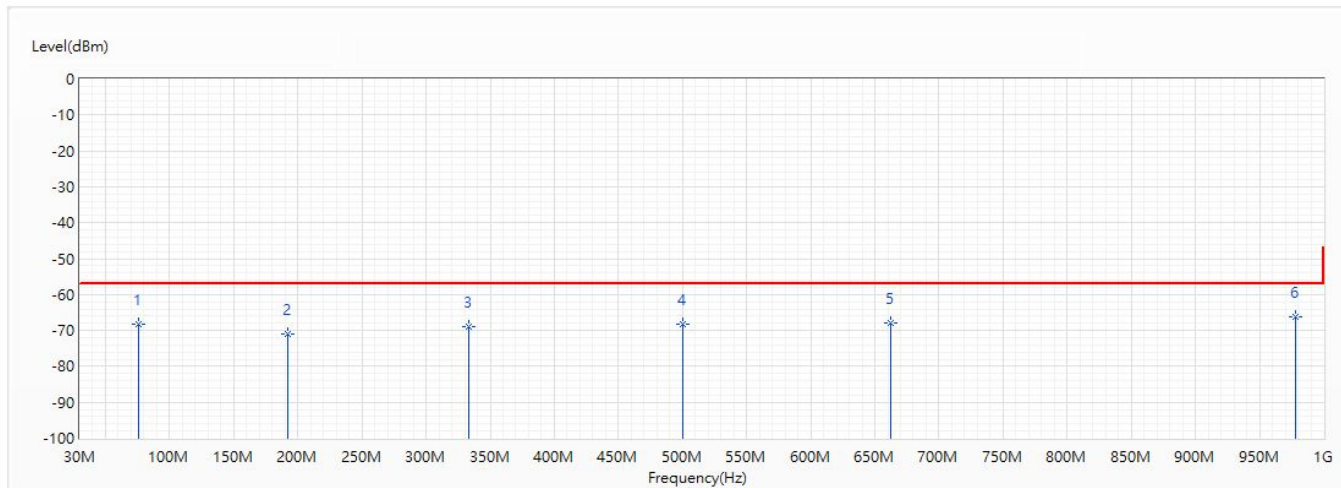


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	67.442	-69.08	-57.00	-12.08	-55.88	-13.20	PK
2	159.689	-70.20	-57.00	-13.20	-59.32	-10.88	PK
3	240.005	-73.91	-57.00	-16.91	-64.46	-9.45	PK
4	333.319	-67.32	-57.00	-10.32	-60.76	-6.56	PK
5	517.425	-67.79	-57.00	-10.79	-65.95	-1.84	PK
* 6	983.995	-65.57	-57.00	-8.57	-67.05	1.48	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/7
Test Mode	Mode 8: Receive Mode_ External PIFA Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2440MHz_1Mbps	Humidity (%RH)	57.0

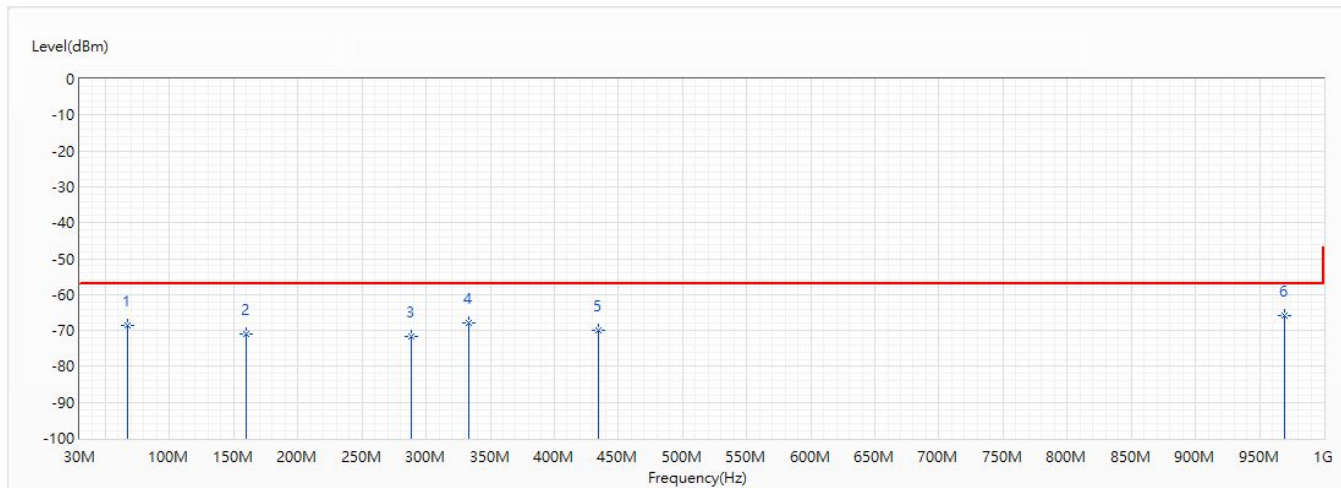


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	75.978	-68.20	-57.00	-11.20	-56.18	-12.02	PK
2	192.087	-71.03	-57.00	-14.03	-59.97	-11.06	PK
3	333.319	-68.79	-57.00	-11.79	-61.80	-6.99	PK
4	499.965	-68.17	-57.00	-11.17	-65.40	-2.77	PK
5	662.149	-67.91	-57.00	-10.91	-66.91	-1.00	PK
* 6	977.593	-66.06	-57.00	-9.06	-66.95	0.89	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/7
Test Mode	Mode 8: Receive Mode_ External PIFA Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2440MHz_2Mbps	Humidity (%RH)	57.0

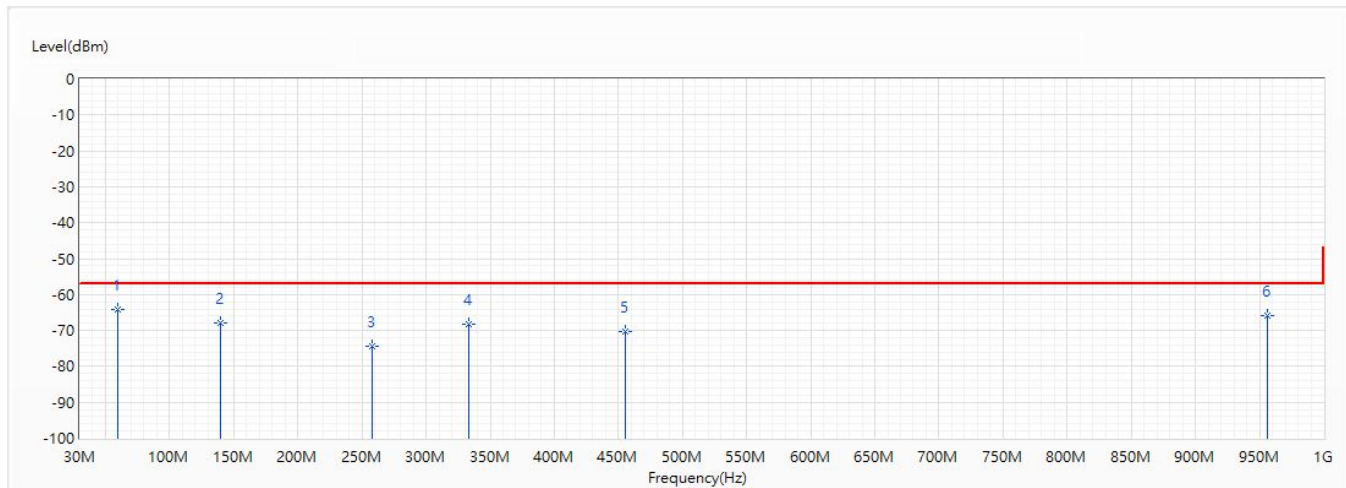


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	66.763	-68.49	-57.00	-11.49	-55.21	-13.28	PK
2	159.689	-70.83	-57.00	-13.83	-59.95	-10.88	PK
3	288.117	-71.77	-57.00	-14.77	-64.42	-7.35	PK
4	333.319	-67.88	-57.00	-10.88	-61.32	-6.56	PK
5	434.684	-70.09	-57.00	-13.09	-66.15	-3.94	PK
* 6	969.93	-65.92	-57.00	-8.92	-67.24	1.32	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/7
Test Mode	Mode 8: Receive Mode_ External PIFA Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2440MHz_2Mbps	Humidity (%RH)	57.0

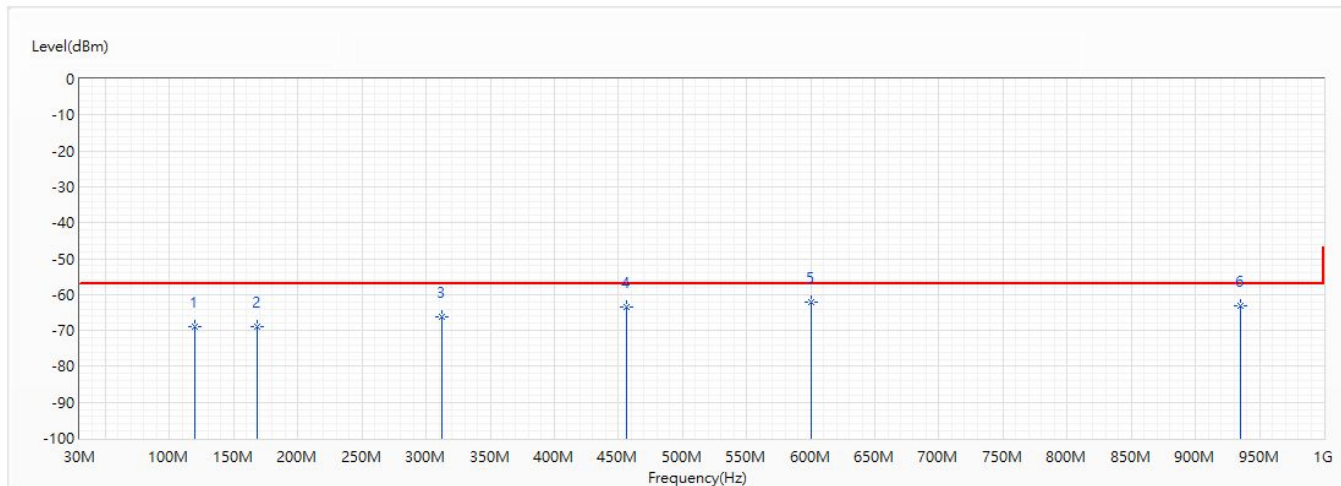


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
* 1	59.1	-64.22	-57.00	-7.22	-51.39	-12.83	PK
2	139.222	-67.79	-57.00	-10.79	-59.44	-8.35	PK
3	257.95	-74.29	-57.00	-17.29	-64.97	-9.32	PK
4	333.222	-68.22	-57.00	-11.22	-61.23	-6.99	PK
5	454.957	-70.24	-57.00	-13.24	-66.63	-3.61	PK
6	955.962	-65.83	-57.00	-8.83	-66.65	0.82	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 9: Receive Mode Internal PCB Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2440MHz_1Mbps	Humidity (%RH)	57.0

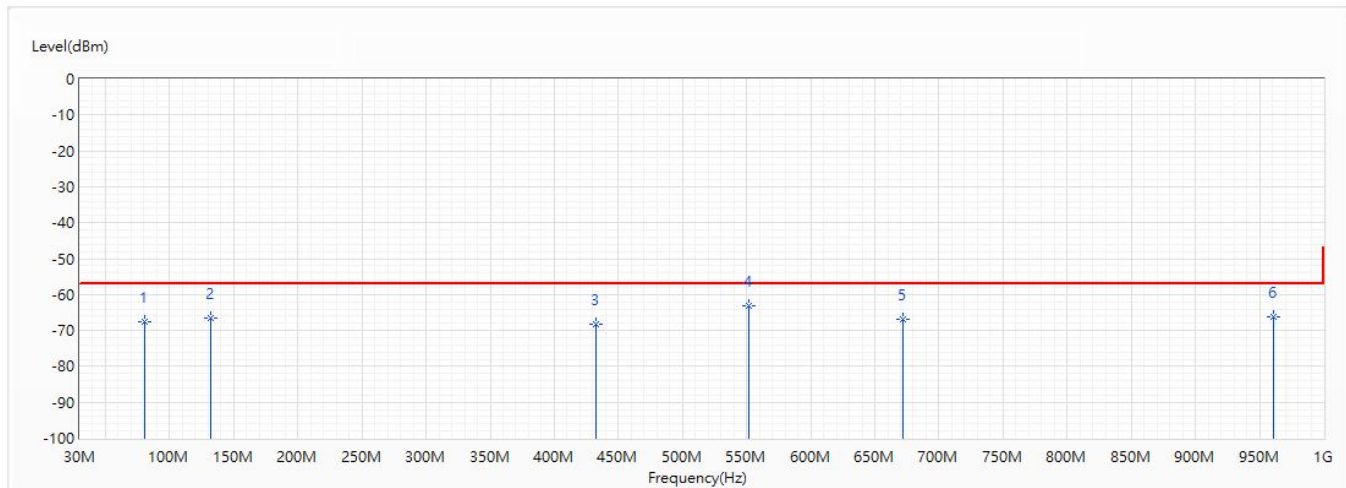


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	120.016	-68.82	-57.00	-11.82	-60.55	-8.27	PK
2	168.031	-68.83	-57.00	-11.83	-57.96	-10.87	PK
3	312.076	-66.15	-57.00	-9.15	-59.34	-6.81	PK
4	456.024	-63.36	-57.00	-6.36	-59.97	-3.39	PK
* 5	600.166	-62.22	-57.00	-5.22	-60.23	-1.99	PK
6	935.592	-63.23	-57.00	-6.23	-64.10	0.87	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 9: Receive Mode Internal PCB Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2440MHz_1Mbps	Humidity (%RH)	57.0

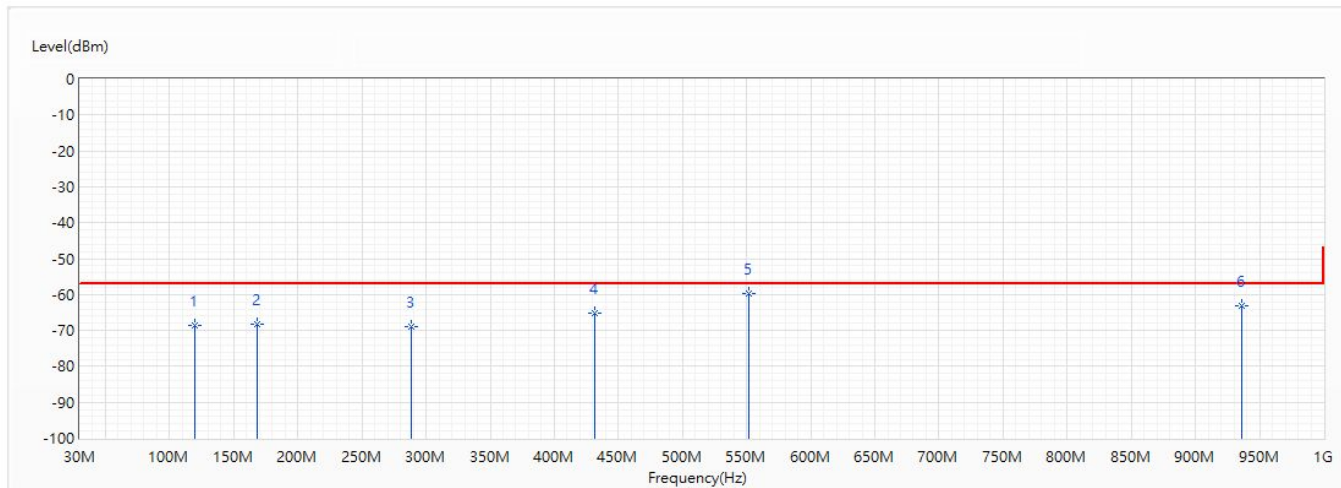


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	81.022	-67.58	-57.00	-10.58	-56.25	-11.33	PK
2	132.044	-66.68	-57.00	-9.68	-59.80	-6.88	PK
3	432.065	-68.40	-57.00	-11.40	-64.19	-4.21	PK
* 4	552.151	-63.12	-57.00	-6.12	-61.64	-1.48	PK
5	672.237	-66.86	-57.00	-9.86	-65.92	-0.94	PK
6	961.006	-66.07	-57.00	-9.07	-66.92	0.85	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 9: Receive Mode Internal PCB Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2440MHz_2Mbps	Humidity (%RH)	57.0

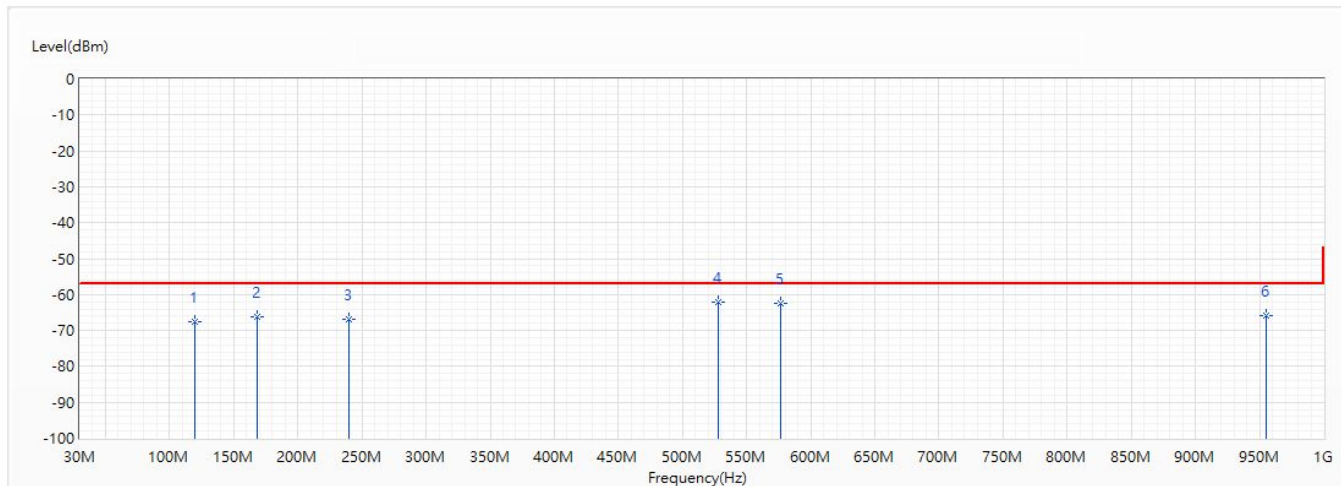


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	120.016	-68.69	-57.00	-11.69	-60.42	-8.27	PK
2	168.031	-68.35	-57.00	-11.35	-57.48	-10.87	PK
3	288.02	-68.80	-57.00	-11.80	-61.45	-7.35	PK
4	431.58	-65.34	-57.00	-8.34	-61.33	-4.01	PK
* 5	552.054	-59.79	-57.00	-2.79	-58.21	-1.58	PK
6	936.077	-63.24	-57.00	-6.24	-64.11	0.87	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 9: Receive Mode Internal PCB Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2440MHz_2Mbps	Humidity (%RH)	57.0



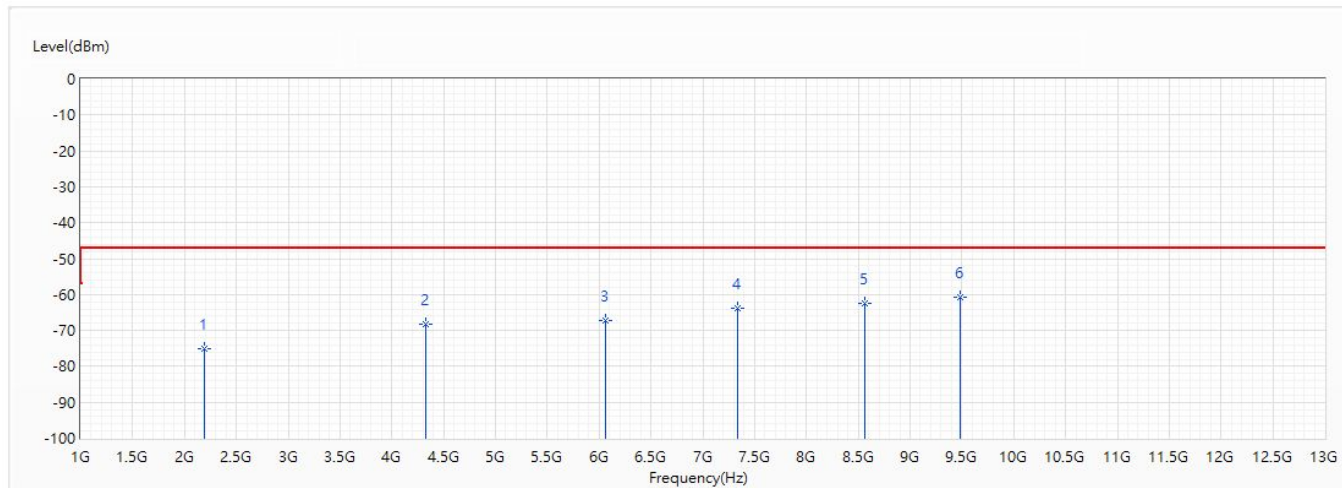
No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	120.016	-67.72	-57.00	-10.72	-61.38	-6.34	PK
2	168.031	-66.15	-57.00	-9.15	-54.87	-11.28	PK
3	240.005	-66.77	-57.00	-9.77	-56.97	-9.80	PK
* 4	528.192	-62.15	-57.00	-5.15	-60.10	-2.05	PK
5	576.11	-62.52	-57.00	-5.52	-61.31	-1.21	PK
6	955.089	-65.96	-57.00	-8.96	-66.78	0.82	PK

Note:

1. All Reading Levels is Peak value.
2. " * ", means this data is the worst emission level.
3. Emission level = Reading Level + Correct Factor.

Above 1GHz Spurious:

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 6: Receive Mode_ External Dipole Ant.	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2402MHz_1Mbps	Humidity (%RH)	57.0

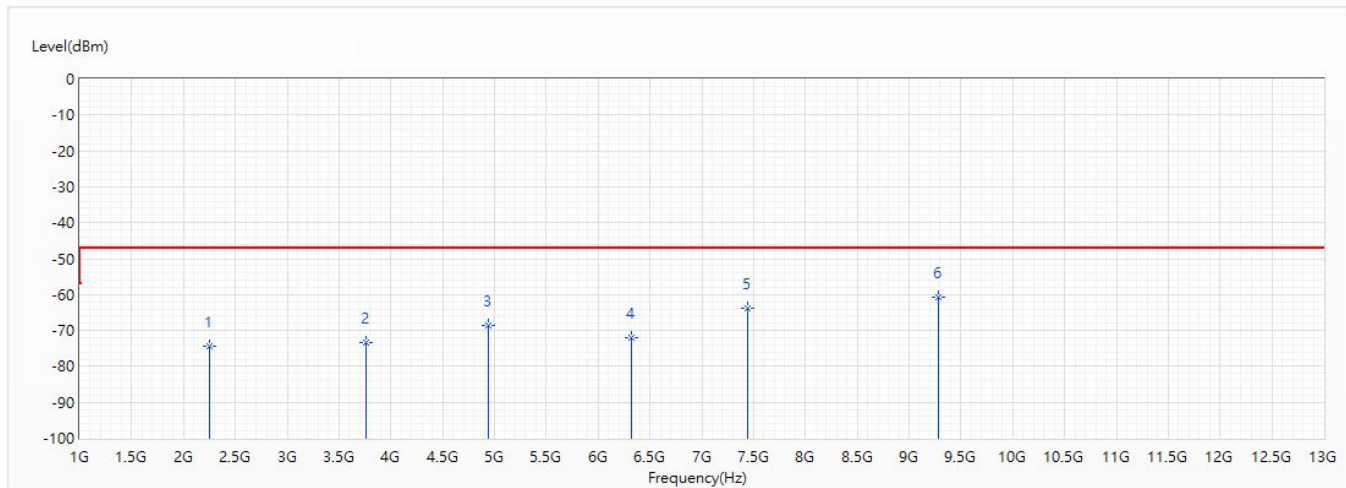


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	2186	-74.94	-47.00	-27.94	-68.63	-6.31	PK
2	4332	-68.25	-47.00	-21.25	-68.10	-0.15	PK
3	6058	-67.33	-47.00	-20.33	-69.76	2.43	PK
4	7331	-63.78	-47.00	-16.78	-69.68	5.90	PK
5	8560	-62.50	-47.00	-15.50	-71.73	9.23	PK
* 6	9478	-60.88	-47.00	-13.88	-72.52	11.64	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 6: Receive Mode_ External Dipole Ant.	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2402MHz_1Mbps	Humidity (%RH)	57.0

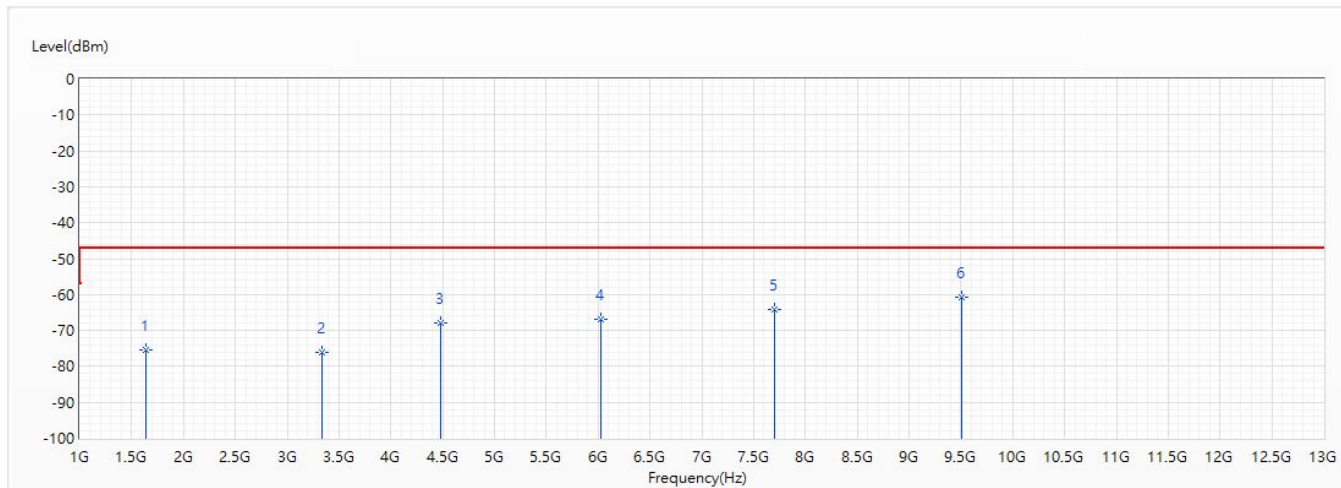


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	2255	-74.39	-47.00	-27.39	-68.26	-6.13	PK
2	3760	-73.39	-47.00	-26.39	-71.87	-1.52	PK
3	4946	-68.62	-47.00	-21.62	-69.61	0.99	PK
4	6316	-71.89	-47.00	-24.89	-73.94	2.05	PK
5	7443	-63.97	-47.00	-16.97	-70.61	6.64	PK
* 6	9282	-60.88	-47.00	-13.88	-71.73	10.85	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 6: Receive Mode_ External Dipole Ant.	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2480MHz_1Mbps	Humidity (%RH)	57.0

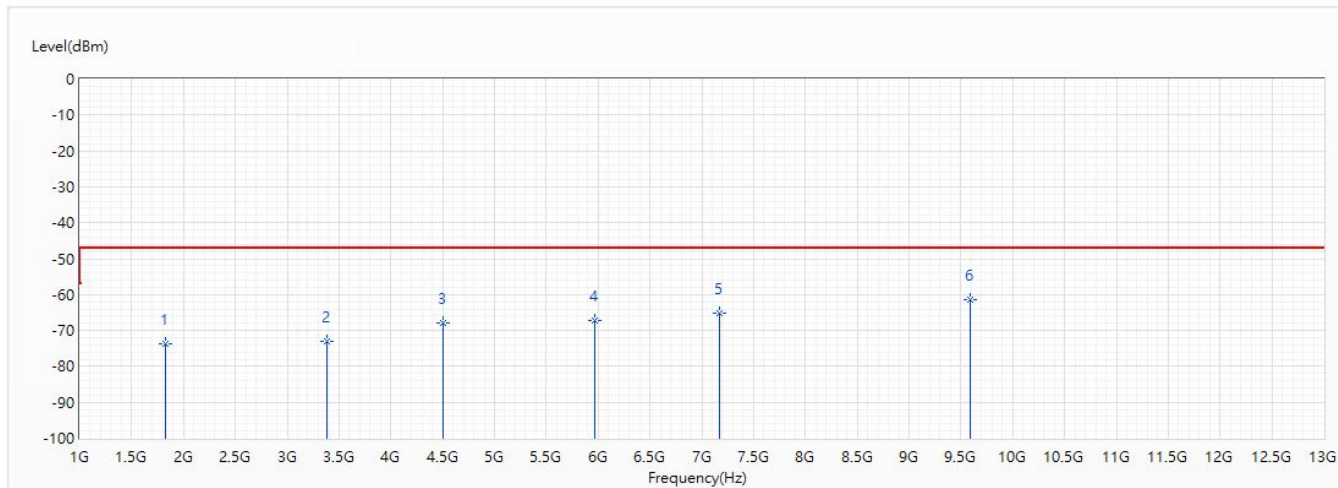


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	1632	-75.46	-47.00	-28.46	-68.56	-6.90	PK
2	3340	-76.04	-47.00	-29.04	-74.11	-1.93	PK
3	4485	-68.01	-47.00	-21.01	-68.76	0.75	PK
4	6022	-67.05	-47.00	-20.05	-69.46	2.41	PK
5	7704	-64.24	-47.00	-17.24	-71.43	7.19	PK
* 6	9507	-60.65	-47.00	-13.65	-72.32	11.67	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 6: Receive Mode_ External Dipole Ant.	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2480MHz_1Mbps	Humidity (%RH)	57.0

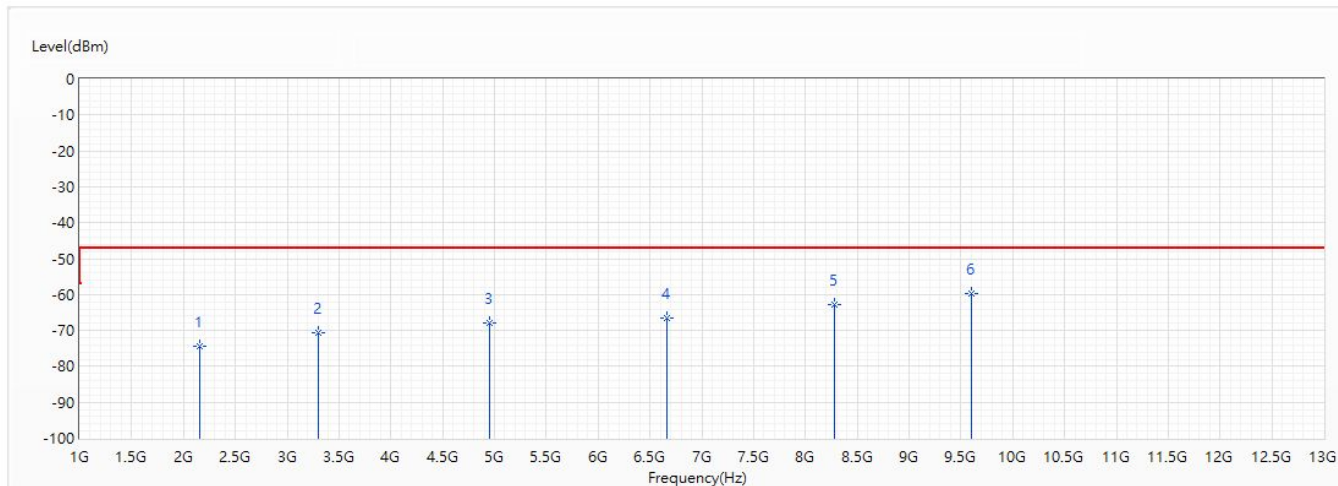


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	1825	-73.57	-47.00	-26.57	-67.15	-6.42	PK
2	3382	-73.15	-47.00	-26.15	-71.52	-1.63	PK
3	4501	-68.01	-47.00	-21.01	-68.70	0.69	PK
4	5972	-67.13	-47.00	-20.13	-69.39	2.26	PK
5	7170	-65.16	-47.00	-18.16	-70.48	5.32	PK
* 6	9589	-61.47	-47.00	-14.47	-72.62	11.15	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/2
Test Mode	Mode 6: Receive Mode_ External Dipole Ant.	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2402MHz_2Mbps	Humidity (%RH)	57.0

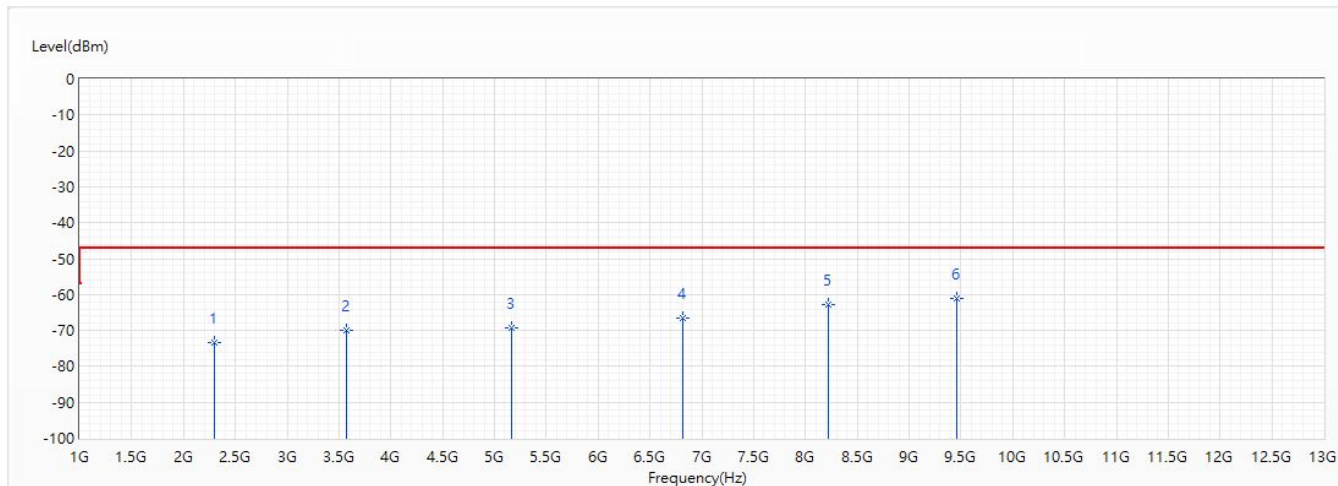


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	2153	-74.43	-47.00	-27.43	-68.14	-6.29	PK
2	3303	-70.62	-47.00	-23.62	-68.52	-2.10	PK
3	4957	-67.80	-47.00	-20.80	-69.60	1.80	PK
4	6667	-66.59	-47.00	-19.59	-69.74	3.15	PK
5	8281	-62.67	-47.00	-15.67	-71.05	8.38	PK
* 6	9596	-59.86	-47.00	-12.86	-71.71	11.85	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/2
Test Mode	Mode 6: Receive Mode_ External Dipole Ant.	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2402MHz_2Mbps	Humidity (%RH)	57.0

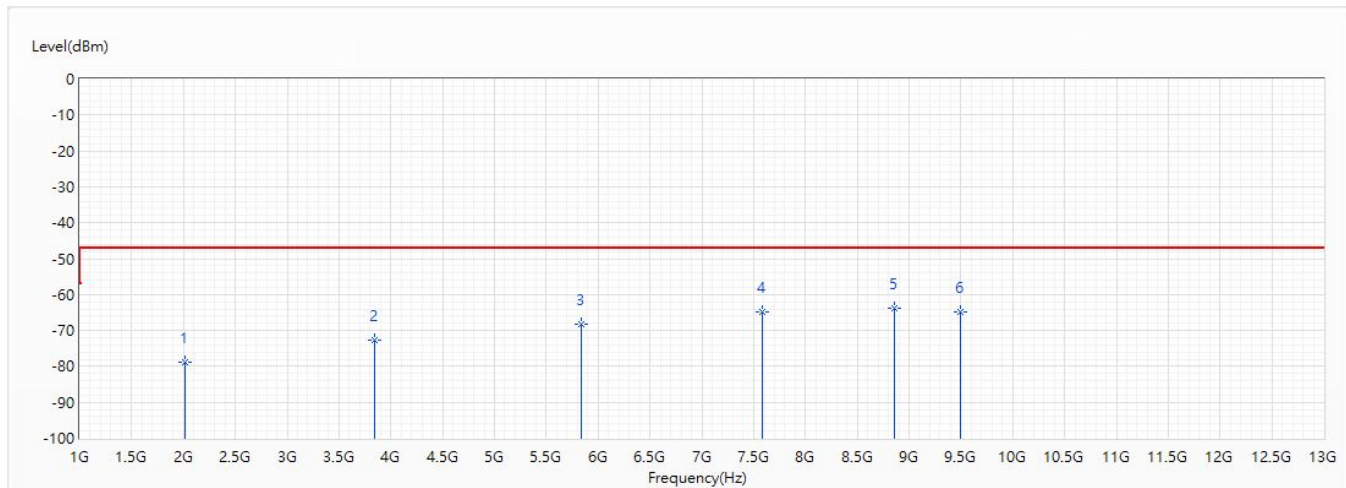


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	2293	-73.43	-47.00	-26.43	-67.28	-6.15	PK
2	3574	-69.95	-47.00	-22.95	-68.72	-1.23	PK
3	5164	-69.30	-47.00	-22.30	-70.12	0.82	PK
4	6817	-66.59	-47.00	-19.59	-70.12	3.53	PK
5	8225	-62.94	-47.00	-15.94	-71.18	8.24	PK
* 6	9456	-61.17	-47.00	-14.17	-71.94	10.77	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/2
Test Mode	Mode 6: Receive Mode_ External Dipole Ant.	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2480MHz_2Mbps	Humidity (%RH)	57.0

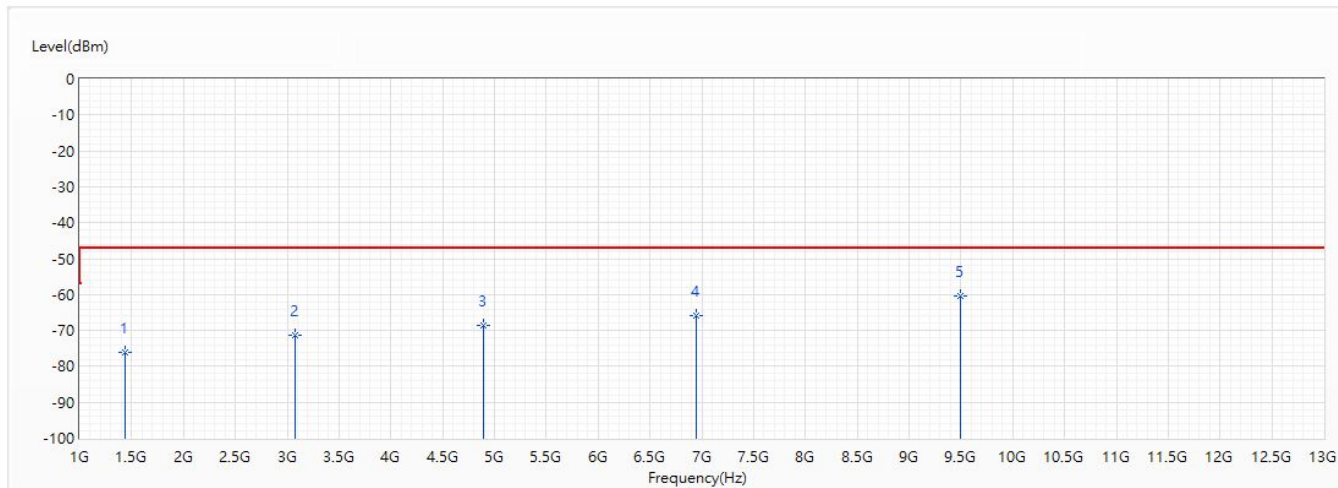


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	2013	-78.94	-47.00	-31.94	-72.68	-6.26	PK
2	3843	-72.58	-47.00	-25.58	-70.79	-1.79	PK
3	5836	-68.20	-47.00	-21.20	-69.86	1.66	PK
4	7581	-64.92	-47.00	-17.92	-71.92	7.00	PK
* 5	8858	-63.77	-47.00	-16.77	-74.32	10.55	PK
6	9490	-64.89	-47.00	-17.89	-76.55	11.66	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/2
Test Mode	Mode 6: Receive Mode_ External Dipole Ant.	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2480MHz_2Mbps	Humidity (%RH)	57.0

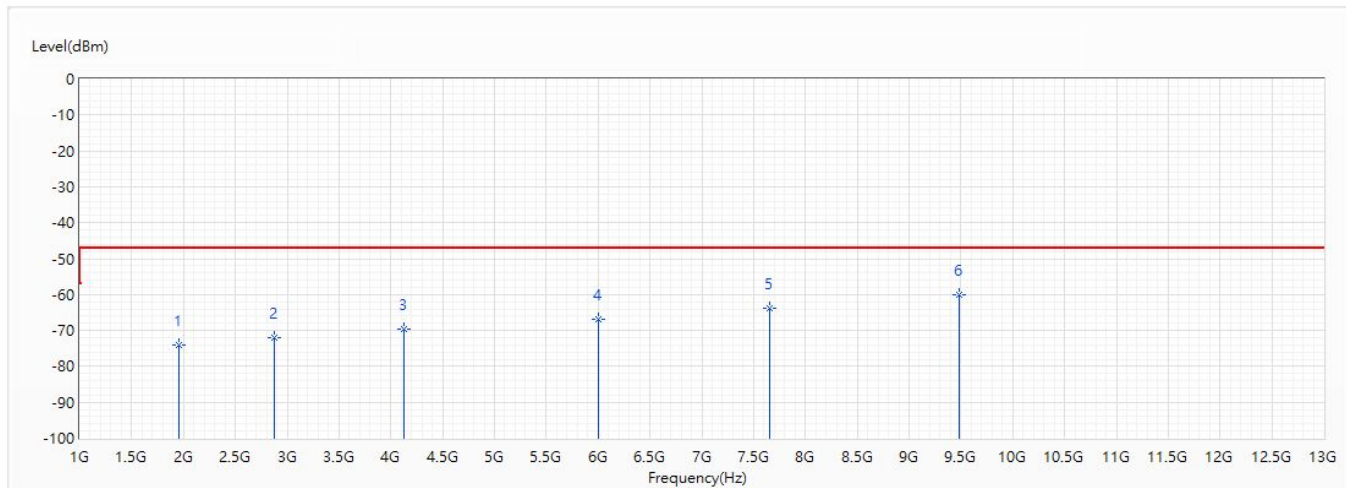


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	1432	-75.96	-47.00	-28.96	-68.53	-7.43	PK
2	3079	-71.45	-47.00	-24.45	-68.54	-2.91	PK
3	4896	-68.69	-47.00	-21.69	-69.64	0.95	PK
4	6944	-65.86	-47.00	-18.86	-70.07	4.21	PK
* 5	9490	-60.33	-47.00	-13.33	-71.10	10.77	PK

Note:

1. All reading levels is Peak value.
2. " * ", means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 7: Receive Mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2402MHz_1Mbps	Humidity (%RH)	57.0

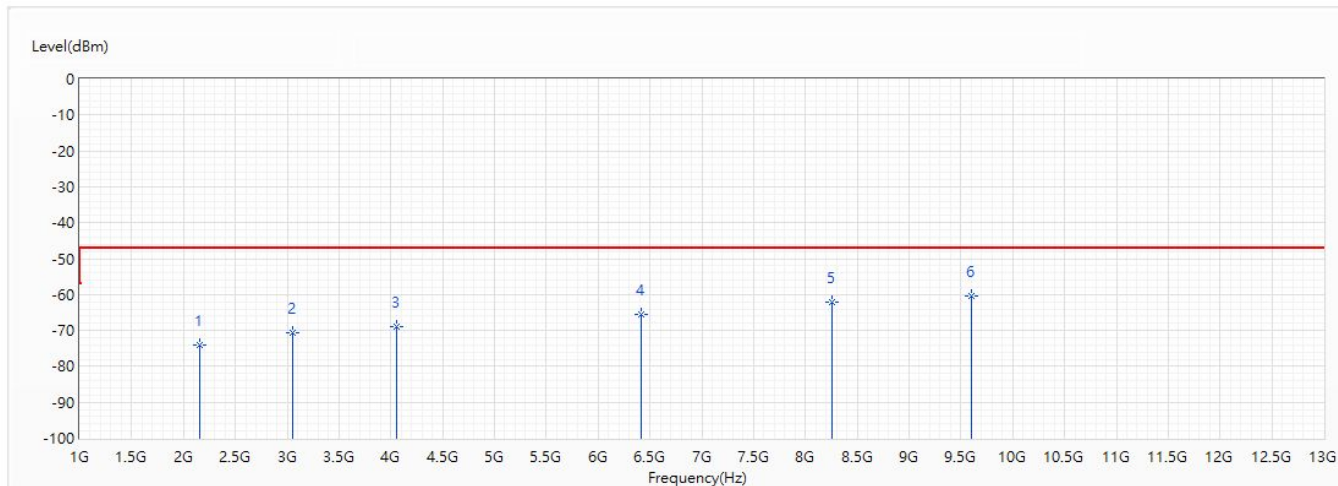


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	1952	-73.97	-47.00	-26.97	-67.63	-6.34	PK
2	2877	-72.01	-47.00	-25.01	-67.76	-4.25	PK
3	4121	-69.68	-47.00	-22.68	-68.30	-1.38	PK
4	6007	-66.85	-47.00	-19.85	-69.24	2.39	PK
5	7650	-63.92	-47.00	-16.92	-71.03	7.11	PK
* 6	9486	-59.92	-47.00	-12.92	-71.56	11.64	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 7: Receive Mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2402MHz_1Mbps	Humidity (%RH)	57.0

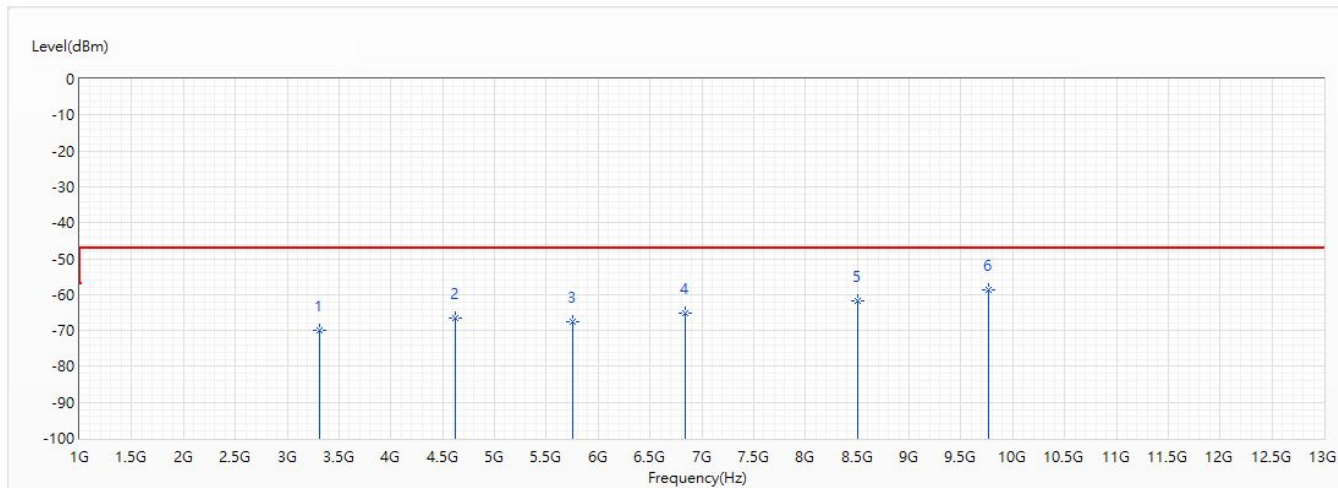


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	2153	-74.02	-47.00	-27.02	-67.93	-6.09	PK
2	3053	-70.78	-47.00	-23.78	-67.77	-3.01	PK
3	4056	-69.06	-47.00	-22.06	-67.48	-1.58	PK
4	6412	-65.42	-47.00	-18.42	-67.37	1.95	PK
5	8256	-62.14	-47.00	-15.14	-70.52	8.38	PK
* 6	9597	-60.54	-47.00	-13.54	-71.73	11.19	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 7: Receive Mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2480MHz_1Mbps	Humidity (%RH)	57.0

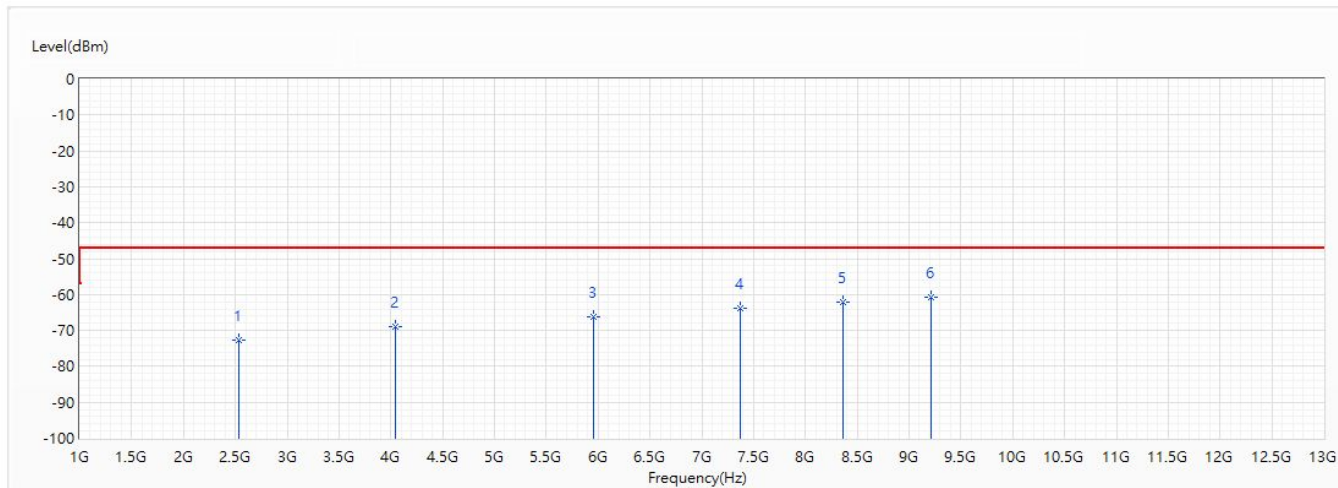


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	3318	-69.95	-47.00	-22.95	-67.92	-2.03	PK
2	4619	-66.41	-47.00	-19.41	-67.50	1.09	PK
3	5751	-67.73	-47.00	-20.73	-69.01	1.28	PK
4	6840	-65.29	-47.00	-18.29	-68.86	3.57	PK
5	8502	-61.90	-47.00	-14.90	-70.87	8.97	PK
* 6	9772	-58.54	-47.00	-11.54	-70.73	12.19	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 7: Receive Mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2480MHz_1Mbps	Humidity (%RH)	57.0

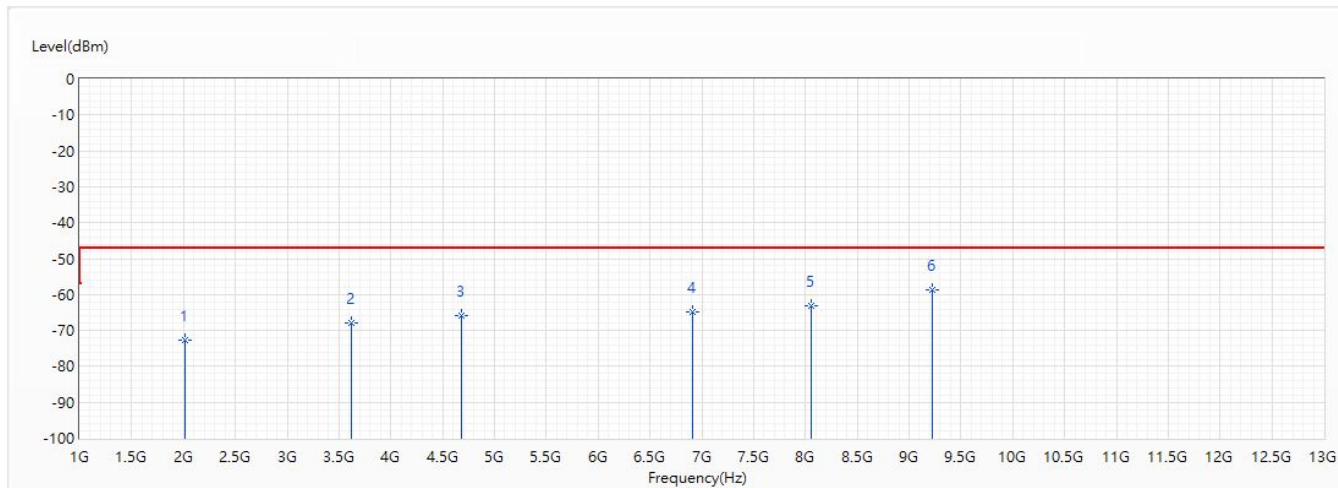


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	2533	-72.63	-47.00	-25.63	-66.61	-6.02	PK
2	4042	-69.10	-47.00	-22.10	-67.44	-1.66	PK
3	5952	-66.28	-47.00	-19.28	-68.47	2.19	PK
4	7366	-63.92	-47.00	-16.92	-70.19	6.27	PK
5	8367	-61.95	-47.00	-14.95	-70.81	8.86	PK
* 6	9211	-60.77	-47.00	-13.77	-71.64	10.87	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 7: Receive Mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2402MHz_2Mbps	Humidity (%RH)	57.0

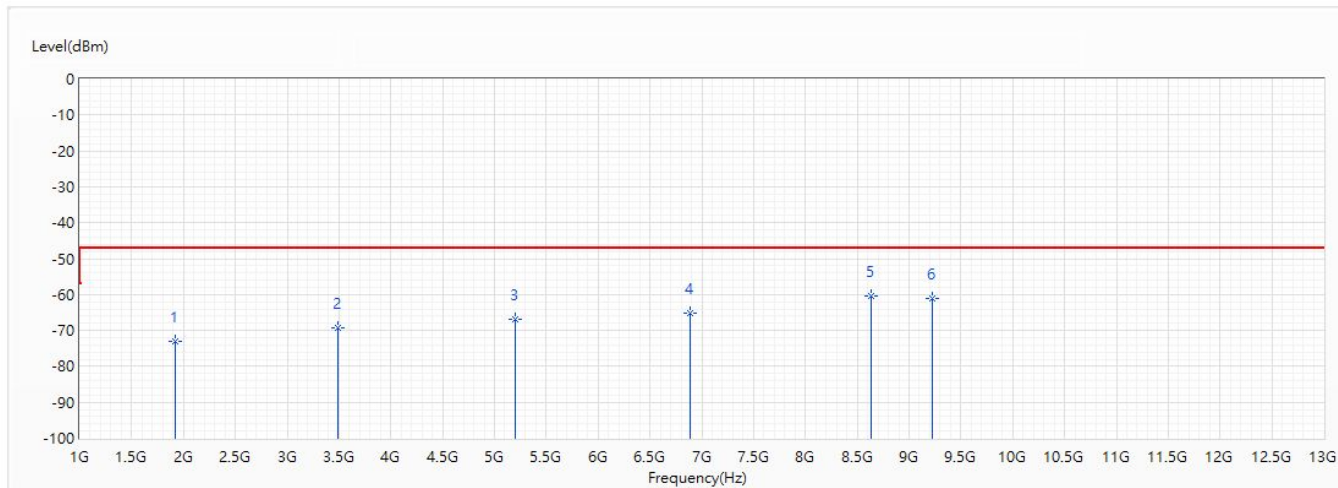


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	2015	-72.53	-47.00	-25.53	-66.26	-6.27	PK
2	3621	-67.98	-47.00	-20.98	-66.61	-1.37	PK
3	4686	-65.71	-47.00	-18.71	-66.93	1.22	PK
4	6913	-64.88	-47.00	-17.88	-68.64	3.76	PK
5	8052	-63.04	-47.00	-16.04	-70.83	7.79	PK
* 6	9229	-58.73	-47.00	-11.73	-70.13	11.40	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 7: Receive Mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2402MHz_2Mbps	Humidity (%RH)	57.0

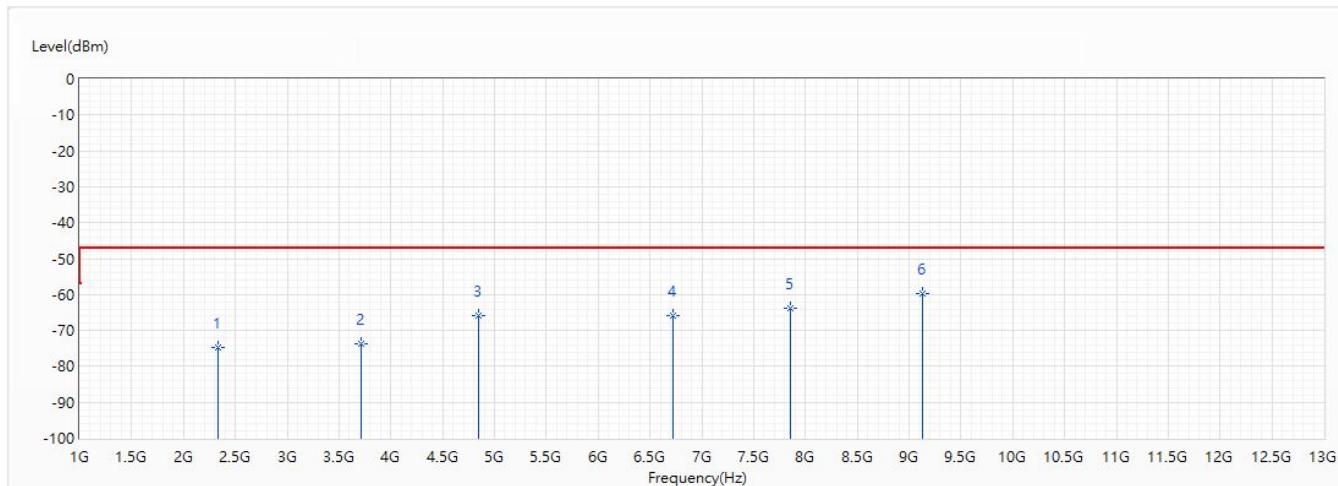


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	1917	-73.02	-47.00	-26.02	-66.80	-6.22	PK
2	3495	-69.15	-47.00	-22.15	-67.99	-1.16	PK
3	5196	-67.04	-47.00	-20.04	-67.83	0.79	PK
4	6887	-65.10	-47.00	-18.10	-69.00	3.90	PK
* 5	8632	-60.39	-47.00	-13.39	-70.24	9.85	PK
6	9223	-61.18	-47.00	-14.18	-72.05	10.87	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 7: Receive Mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2480MHz_2Mbps	Humidity (%RH)	57.0

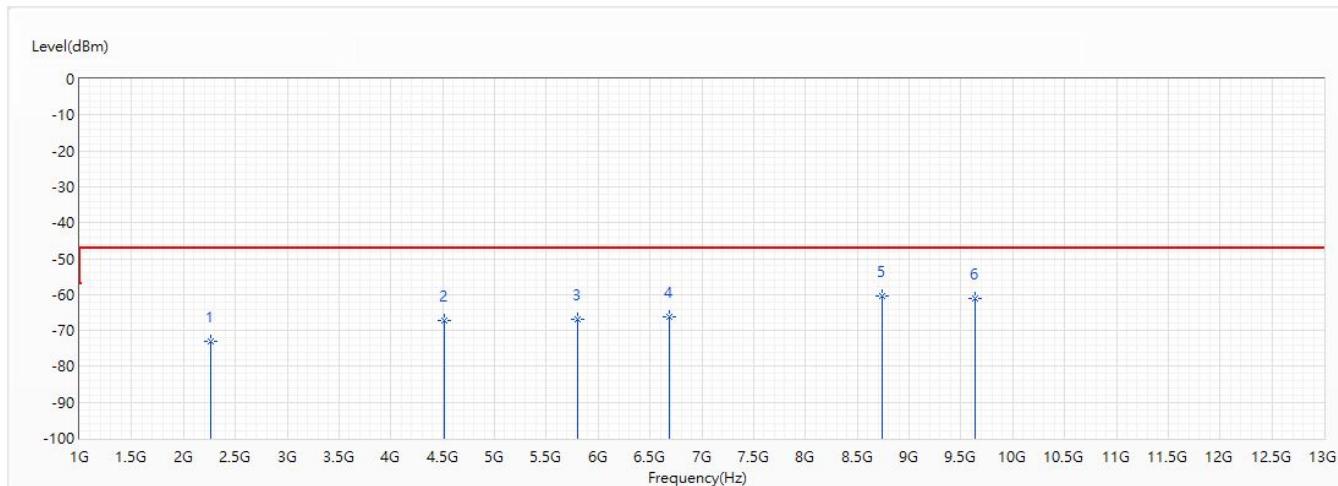


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	2338	-74.62	-47.00	-27.62	-68.27	-6.35	PK
2	3718	-73.55	-47.00	-26.55	-72.01	-1.54	PK
3	4843	-66.04	-47.00	-19.04	-67.60	1.56	PK
4	6721	-65.70	-47.00	-18.70	-68.98	3.28	PK
5	7851	-63.78	-47.00	-16.78	-71.19	7.41	PK
* 6	9130	-59.78	-47.00	-12.78	-71.09	11.31	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/6
Test Mode	Mode 7: Receive Mode_ External PCB Ant.	Engineer	Rueyyan
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2480MHz_2Mbps	Humidity (%RH)	57.0

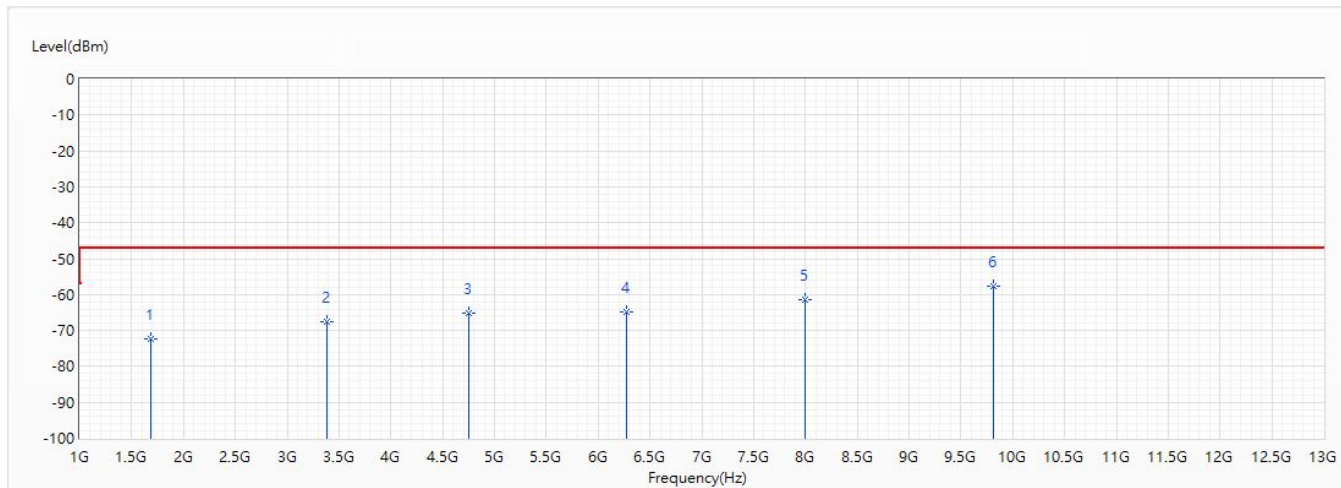


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	2263	-73.18	-47.00	-26.18	-67.05	-6.13	PK
2	4522	-67.34	-47.00	-20.34	-68.04	0.70	PK
3	5806	-66.81	-47.00	-19.81	-68.42	1.61	PK
4	6693	-66.07	-47.00	-19.07	-68.94	2.87	PK
* 5	8739	-60.53	-47.00	-13.53	-70.70	10.17	PK
6	9641	-60.99	-47.00	-13.99	-72.37	11.38	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/7
Test Mode	Mode 8: Receive Mode_ External PIFA Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	23.0
Test Condition	2402MHz_1Mbps	Humidity (%RH)	51.0

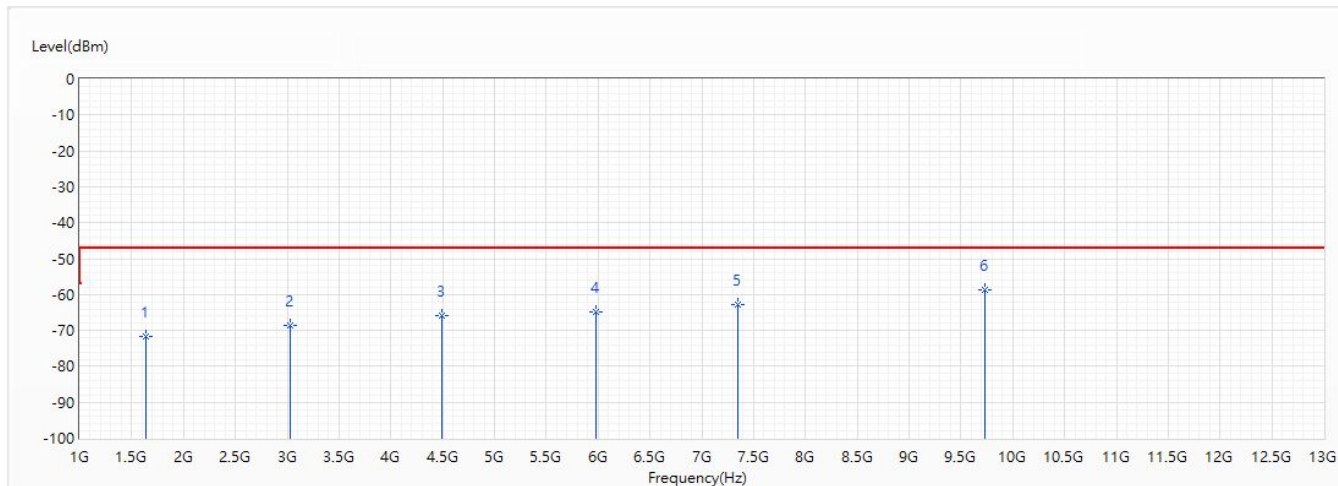


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	1685	-72.48	-47.00	-25.48	-65.67	-6.81	PK
2	3386	-67.59	-47.00	-20.59	-65.89	-1.70	PK
3	4753	-65.04	-47.00	-18.04	-66.41	1.37	PK
4	6277	-64.73	-47.00	-17.73	-67.33	2.60	PK
5	8001	-61.57	-47.00	-14.57	-69.22	7.65	PK
* 6	9820	-57.54	-47.00	-10.54	-69.82	12.28	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/7
Test Mode	Mode 8: Receive Mode_ External PIFA Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	23.0
Test Condition	2402MHz_1Mbps	Humidity (%RH)	51.0

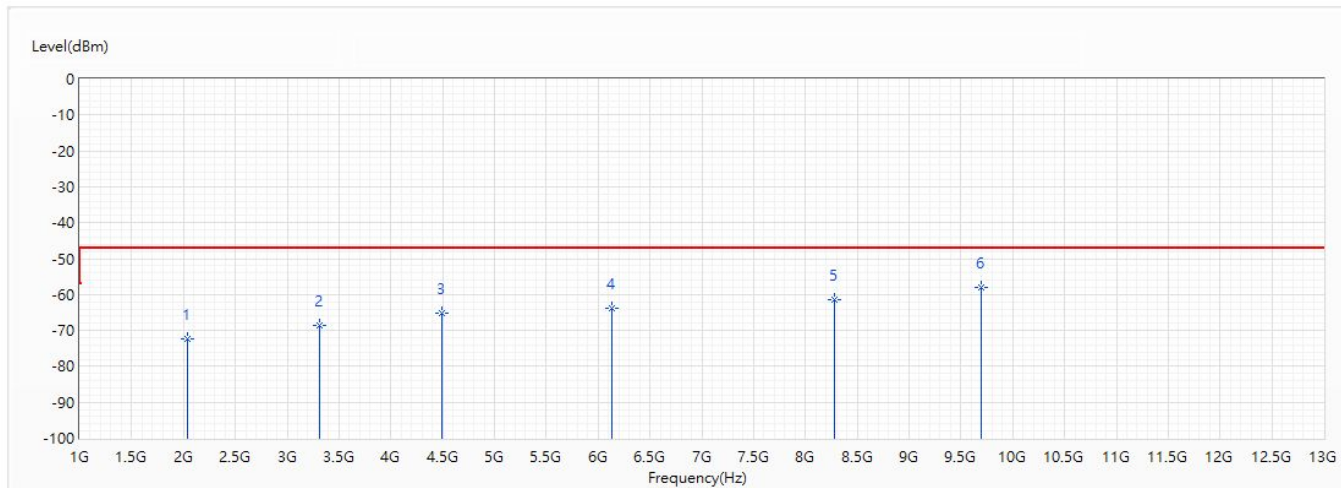


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	1643	-71.56	-47.00	-24.56	-64.76	-6.80	PK
2	3029	-68.50	-47.00	-21.50	-65.37	-3.13	PK
3	4495	-65.89	-47.00	-18.89	-66.55	0.66	PK
4	5975	-64.74	-47.00	-17.74	-67.02	2.28	PK
5	7343	-62.85	-47.00	-15.85	-69.00	6.15	PK
* 6	9734	-58.81	-47.00	-11.81	-70.61	11.80	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/7
Test Mode	Mode 8: Receive Mode_ External PIFA Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	23.0
Test Condition	2480MHz_1Mbps	Humidity (%RH)	51.0

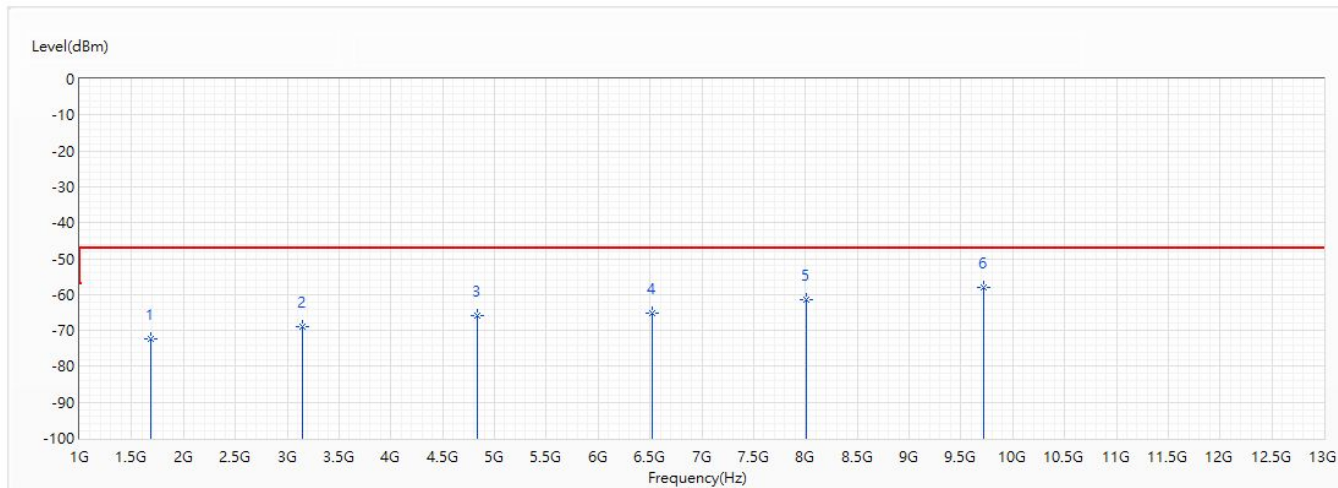


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	2038	-72.24	-47.00	-25.24	-65.97	-6.27	PK
2	3310	-68.54	-47.00	-21.54	-66.47	-2.07	PK
3	4497	-65.12	-47.00	-18.12	-65.94	0.82	PK
4	6135	-63.75	-47.00	-16.75	-66.24	2.49	PK
5	8284	-61.53	-47.00	-14.53	-69.92	8.39	PK
* 6	9697	-58.12	-47.00	-11.12	-70.16	12.04	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/7
Test Mode	Mode 8: Receive Mode_ External PIFA Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	23.0
Test Condition	2480MHz_1Mbps	Humidity (%RH)	51.0

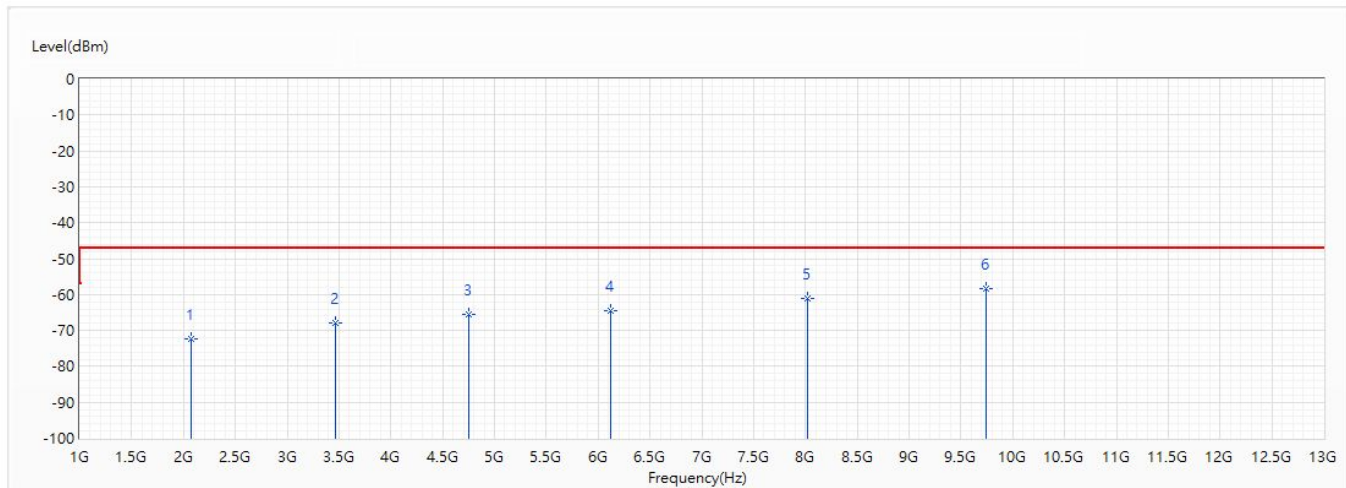


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	1684	-72.33	-47.00	-25.33	-65.61	-6.72	PK
2	3145	-68.82	-47.00	-21.82	-66.18	-2.64	PK
3	4837	-65.93	-47.00	-18.93	-66.85	0.92	PK
4	6523	-65.20	-47.00	-18.20	-67.17	1.97	PK
5	8005	-61.32	-47.00	-14.32	-68.58	7.26	PK
* 6	9723	-57.98	-47.00	-10.98	-69.73	11.75	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/7
Test Mode	Mode 8: Receive Mode_ External PIFA Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	23.0
Test Condition	2402MHz_2Mbps	Humidity (%RH)	51.0

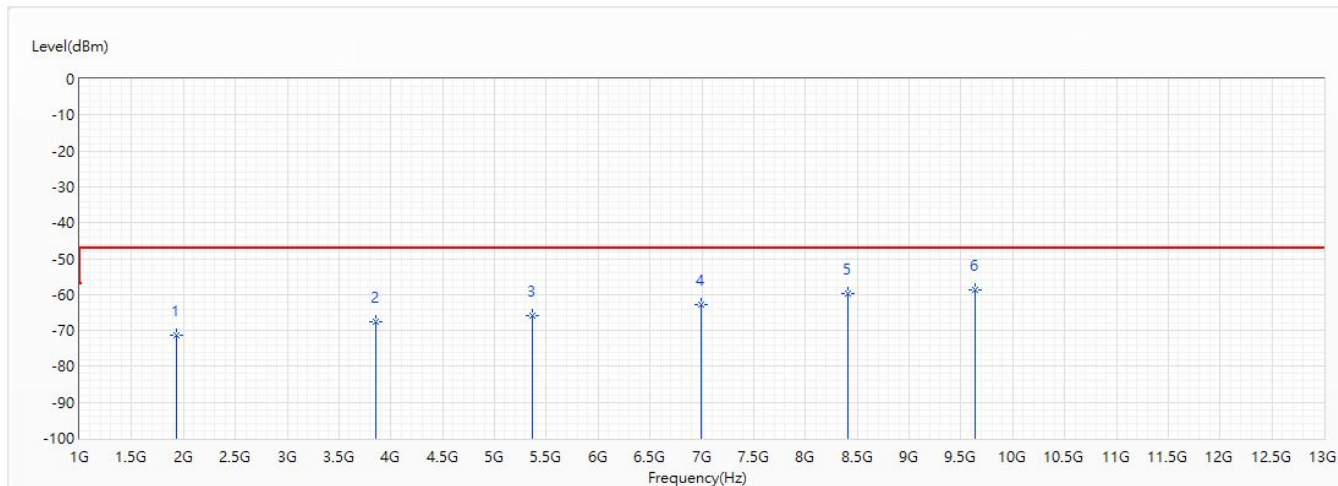


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	2078	-72.19	-47.00	-25.19	-65.91	-6.28	PK
2	3463	-67.81	-47.00	-20.81	-66.47	-1.34	PK
3	4752	-65.43	-47.00	-18.43	-66.80	1.37	PK
4	6123	-64.55	-47.00	-17.55	-67.04	2.49	PK
5	8025	-61.20	-47.00	-14.20	-68.91	7.71	PK
* 6	9743	-58.35	-47.00	-11.35	-70.48	12.13	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/7
Test Mode	Mode 8: Receive Mode_ External PIFA Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	23.0
Test Condition	2402MHz_2Mbps	Humidity (%RH)	51.0

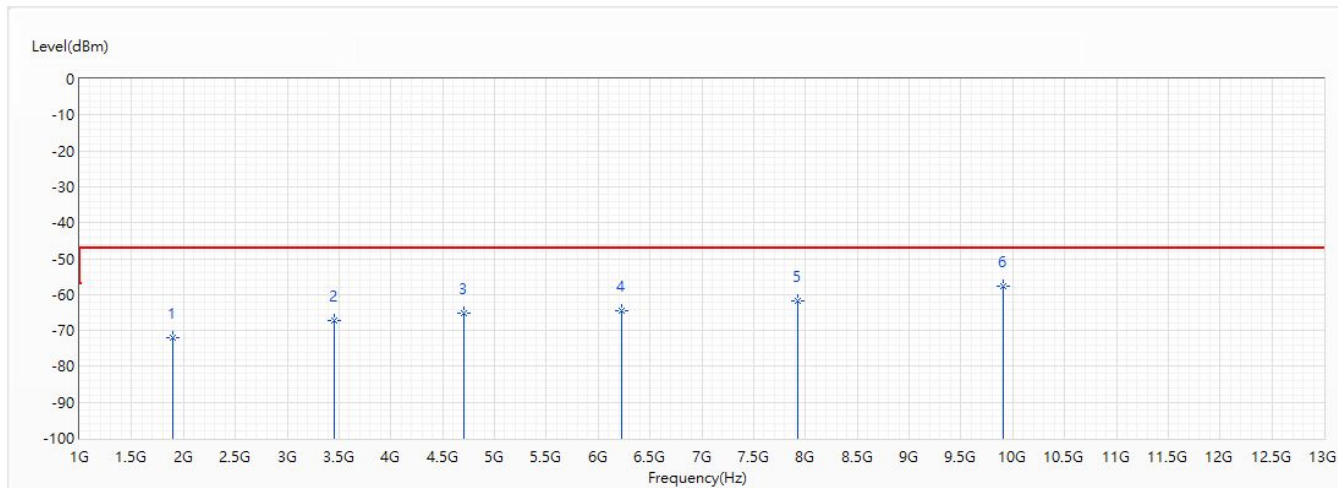


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	1934	-71.23	-47.00	-24.23	-65.05	-6.18	PK
2	3856	-67.57	-47.00	-20.57	-65.91	-1.66	PK
3	5365	-65.84	-47.00	-18.84	-66.42	0.58	PK
4	6995	-62.96	-47.00	-15.96	-67.44	4.48	PK
5	8412	-59.86	-47.00	-12.86	-68.93	9.07	PK
* 6	9639	-58.86	-47.00	-11.86	-70.23	11.37	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/7
Test Mode	Mode 8: Receive Mode_ External PIFA Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	23.0
Test Condition	2480MHz_2Mbps	Humidity (%RH)	51.0

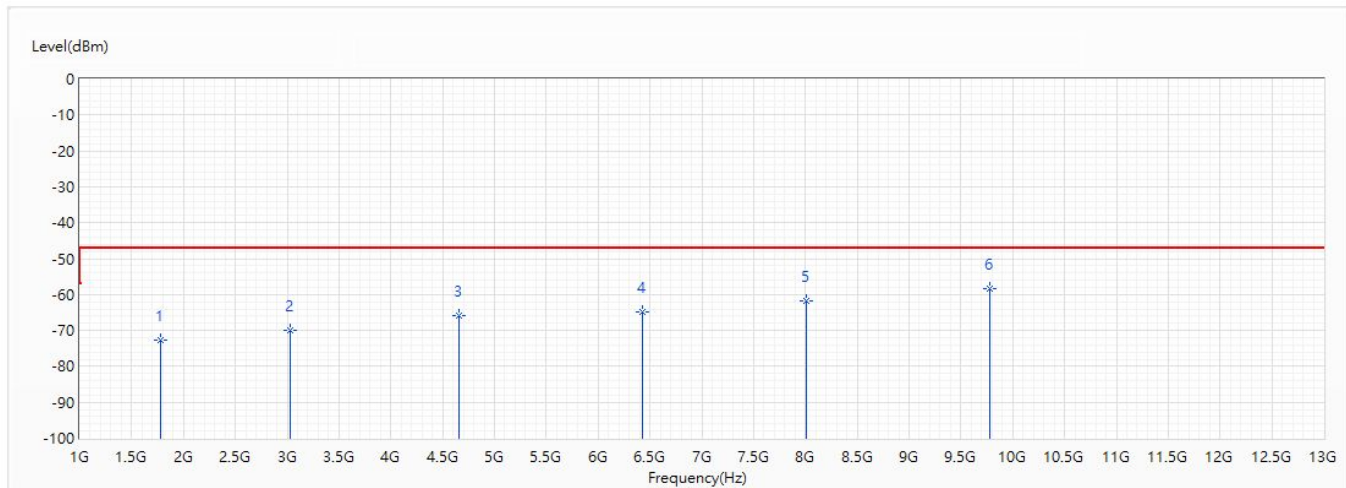


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	1895	-71.90	-47.00	-24.90	-65.46	-6.44	PK
2	3449	-67.30	-47.00	-20.30	-65.90	-1.40	PK
3	4706	-65.10	-47.00	-18.10	-66.38	1.28	PK
4	6224	-64.44	-47.00	-17.44	-67.00	2.56	PK
5	7923	-61.63	-47.00	-14.63	-69.14	7.51	PK
* 6	9905	-57.81	-47.00	-10.81	-70.25	12.44	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/7
Test Mode	Mode 8: Receive Mode_ External PIFA Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	23.0
Test Condition	2480MHz_2Mbps	Humidity (%RH)	51.0

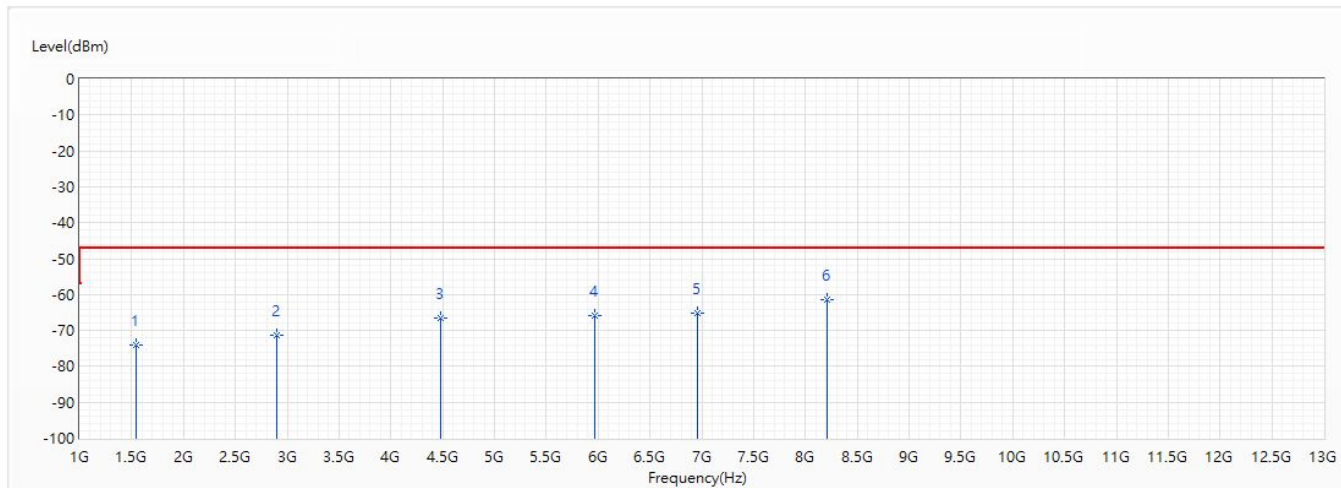


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	1776	-72.58	-47.00	-25.58	-66.06	-6.52	PK
2	3028	-69.92	-47.00	-22.92	-66.79	-3.13	PK
3	4660	-65.90	-47.00	-18.90	-66.70	0.80	PK
4	6424	-64.74	-47.00	-17.74	-66.67	1.93	PK
5	8003	-61.62	-47.00	-14.62	-68.87	7.25	PK
* 6	9782	-58.51	-47.00	-11.51	-70.52	12.01	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 9: Receive Mode Internal PCB Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2402MHz_1Mbps	Humidity (%RH)	57.0

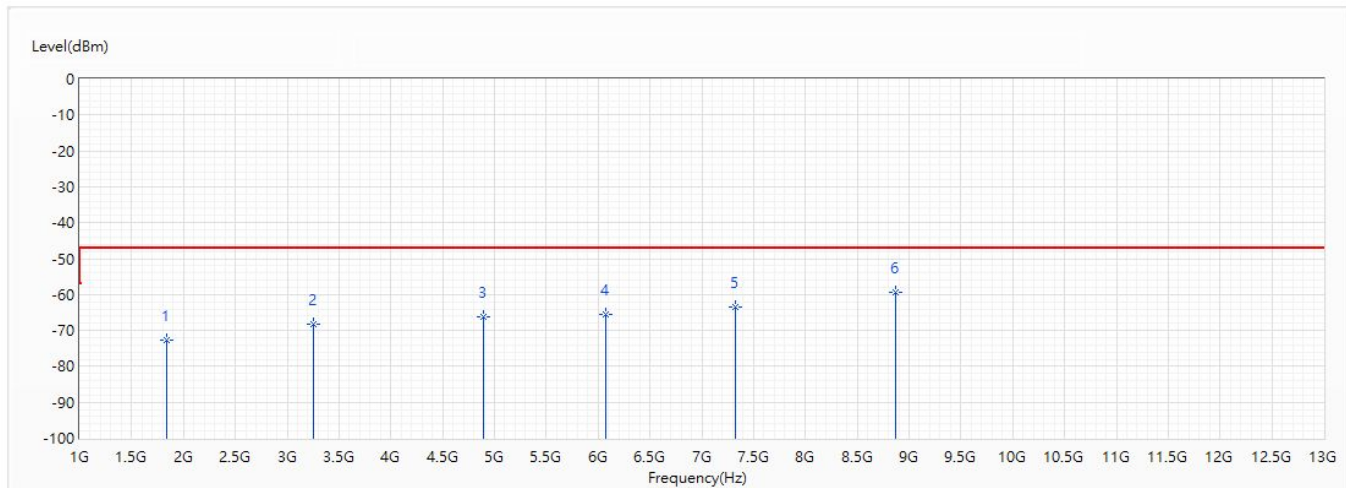


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	1545	-73.90	-47.00	-26.90	-66.84	-7.06	PK
2	2895	-71.49	-47.00	-24.49	-67.34	-4.15	PK
3	4480	-66.72	-47.00	-19.72	-67.44	0.72	PK
4	5963	-65.79	-47.00	-18.79	-68.01	2.22	PK
5	6954	-65.03	-47.00	-18.03	-68.89	3.86	PK
* 6	8215	-61.45	-47.00	-14.45	-69.66	8.21	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 9: Receive Mode Internal PCB Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2402MHz_1Mbps	Humidity (%RH)	57.0

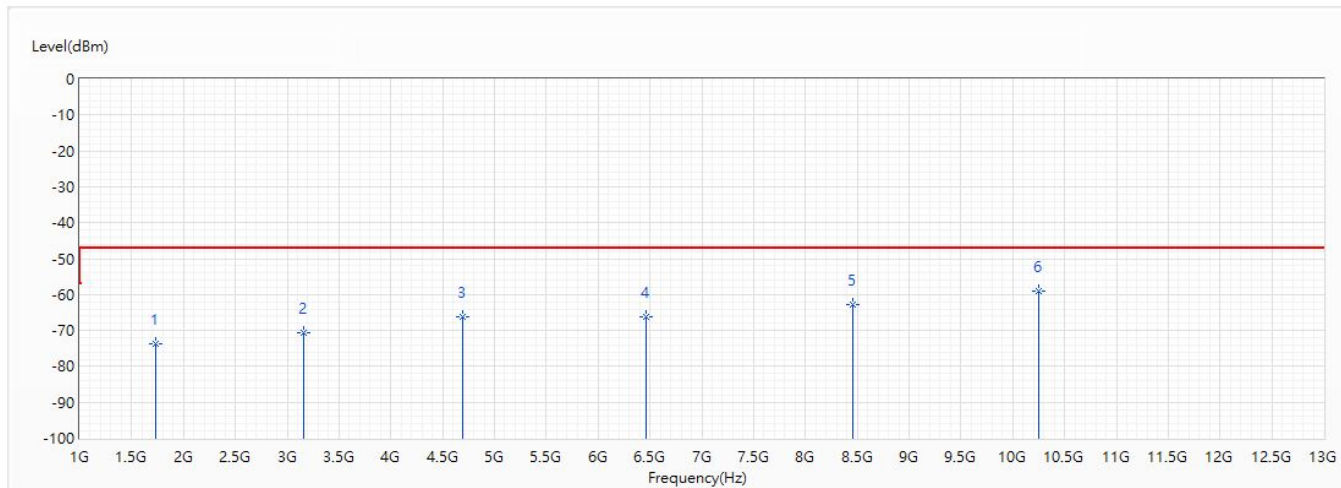


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	1835	-72.65	-47.00	-25.65	-66.25	-6.40	PK
2	3259	-68.43	-47.00	-21.43	-66.27	-2.16	PK
3	4894	-66.24	-47.00	-19.24	-67.19	0.95	PK
4	6074	-65.36	-47.00	-18.36	-67.67	2.31	PK
5	7325	-63.53	-47.00	-16.53	-69.59	6.06	PK
* 6	8871	-59.52	-47.00	-12.52	-70.08	10.56	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 9: Receive Mode Internal PCB Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2480MHz_1Mbps	Humidity (%RH)	57.0

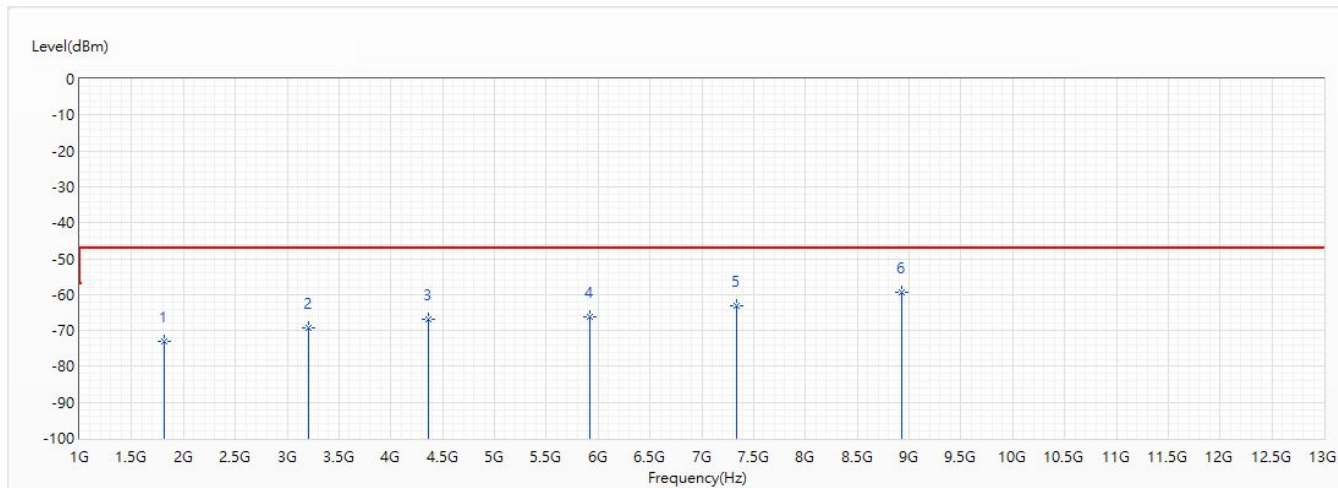


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	1735	-73.57	-47.00	-26.57	-66.85	-6.72	PK
2	3155	-70.57	-47.00	-23.57	-67.74	-2.83	PK
3	4698	-66.37	-47.00	-19.37	-67.63	1.26	PK
4	6462	-66.11	-47.00	-19.11	-68.83	2.72	PK
5	8460	-62.79	-47.00	-15.79	-71.65	8.86	PK
* 6	10248	-59.11	-47.00	-12.11	-72.33	13.22	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 9: Receive Mode Internal PCB Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2480MHz_1Mbps	Humidity (%RH)	57.0

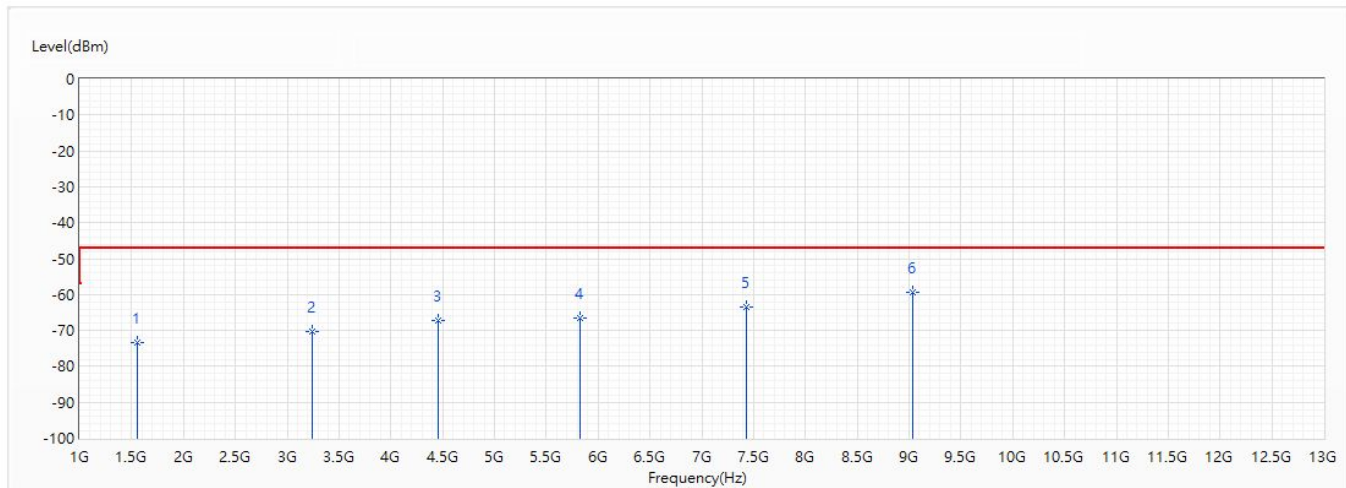


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	1810	-73.05	-47.00	-26.05	-66.59	-6.46	PK
2	3209	-69.29	-47.00	-22.29	-66.92	-2.37	PK
3	4361	-66.85	-47.00	-19.85	-66.82	-0.03	PK
4	5918	-66.16	-47.00	-19.16	-68.21	2.05	PK
5	7332	-63.20	-47.00	-16.20	-69.30	6.10	PK
* 6	8927	-59.48	-47.00	-12.48	-70.22	10.74	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 9: Receive Mode Internal PCB Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2402MHz_2Mbps	Humidity (%RH)	57.0

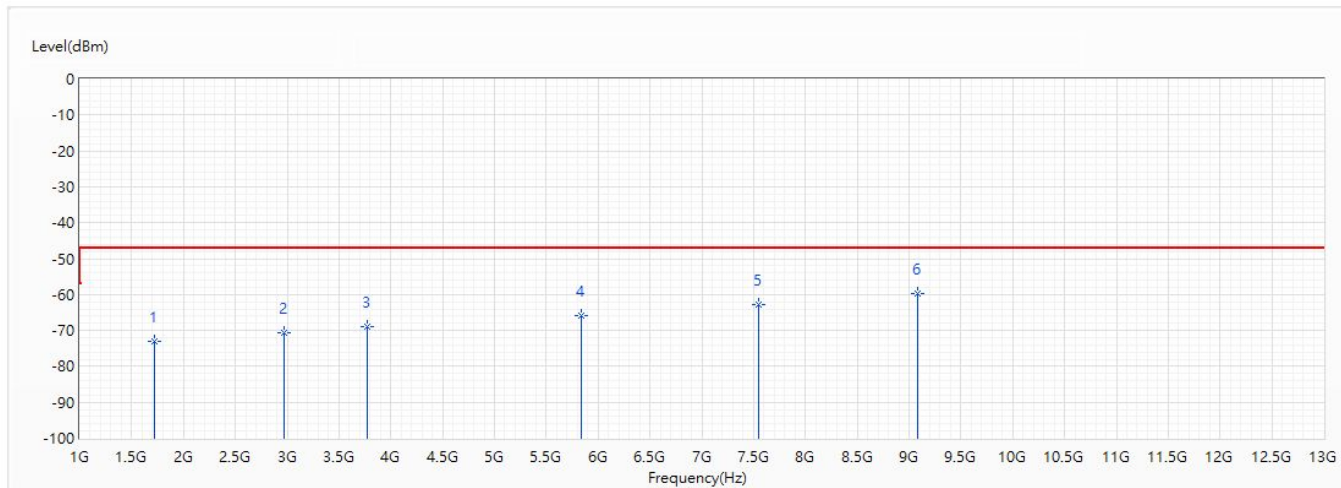


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	1555	-73.45	-47.00	-26.45	-66.41	-7.04	PK
2	3242	-70.16	-47.00	-23.16	-67.76	-2.40	PK
3	4460	-67.17	-47.00	-20.17	-67.78	0.61	PK
4	5830	-66.46	-47.00	-19.46	-68.09	1.63	PK
5	7431	-63.59	-47.00	-16.59	-70.07	6.48	PK
* 6	9033	-59.53	-47.00	-12.53	-70.75	11.22	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 9: Receive Mode Internal PCB Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2402MHz_2Mbps	Humidity (%RH)	57.0

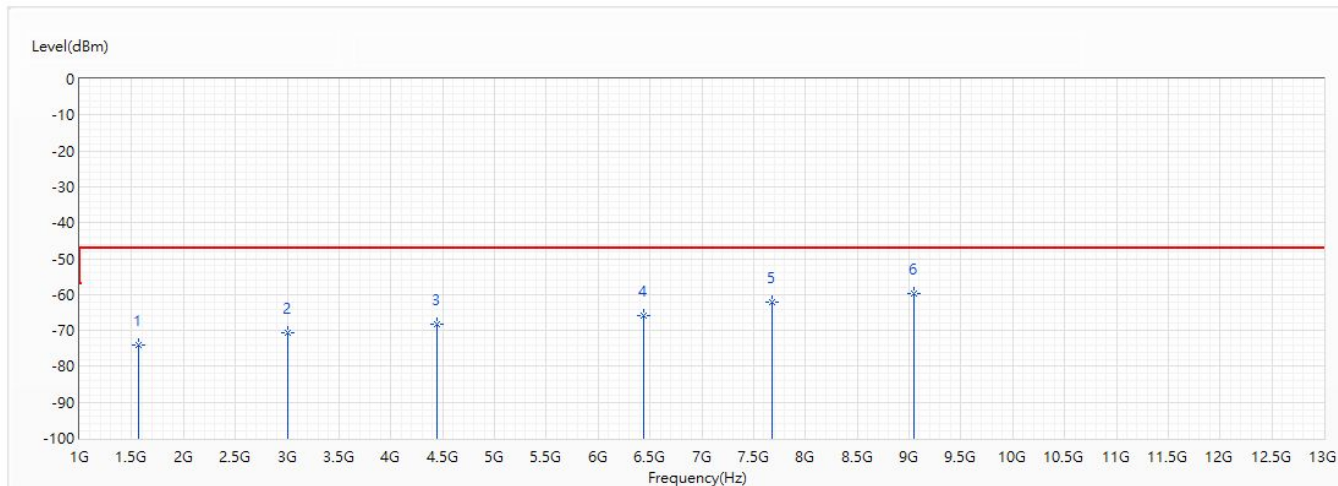


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	1717	-73.18	-47.00	-26.18	-66.53	-6.65	PK
2	2976	-70.48	-47.00	-23.48	-67.10	-3.38	PK
3	3770	-68.95	-47.00	-21.95	-67.42	-1.53	PK
4	5843	-65.78	-47.00	-18.78	-67.54	1.76	PK
5	7544	-62.91	-47.00	-15.91	-69.84	6.93	PK
* 6	9080	-59.76	-47.00	-12.76	-70.68	10.92	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 9: Receive Mode Internal PCB Ant.	Engineer	Lion
Polarity	Horizontal	Temperature (°C)	25.0
Test Condition	2480MHz_2Mbps	Humidity (%RH)	57.0

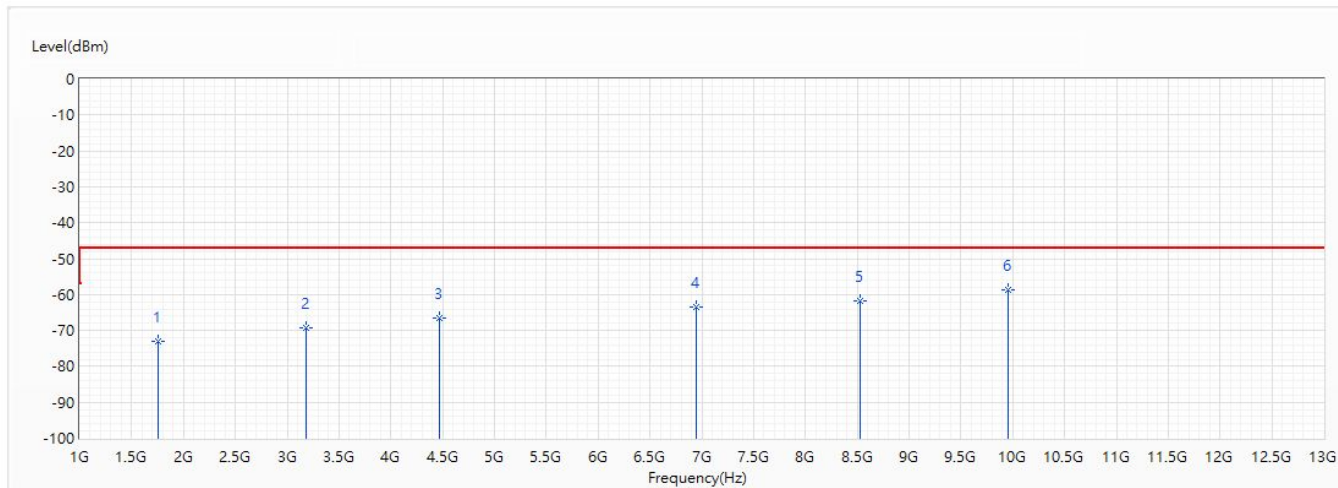


No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	1570	-73.99	-47.00	-26.99	-66.98	-7.01	PK
2	3011	-70.62	-47.00	-23.62	-67.10	-3.52	PK
3	4442	-68.24	-47.00	-21.24	-68.74	0.50	PK
4	6441	-65.98	-47.00	-18.98	-68.69	2.71	PK
5	7682	-62.05	-47.00	-15.05	-69.21	7.16	PK
* 6	9043	-59.62	-47.00	-12.62	-70.85	11.23	PK

Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

Model No	BL653	Site	CB3-H
Test Voltage	DC 3.3V	Test Date	2020/4/1
Test Mode	Mode 9: Receive Mode Internal PCB Ant.	Engineer	Lion
Polarity	Vertical	Temperature (°C)	25.0
Test Condition	2480MHz_2Mbps	Humidity (%RH)	57.0



No	Frequency (MHz)	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Reading Level (dBm)	Correct Factor (dB/m)	Detector Type
1	1757	-72.89	-47.00	-25.89	-66.33	-6.56	PK
2	3179	-69.16	-47.00	-22.16	-66.67	-2.49	PK
3	4467	-66.41	-47.00	-19.41	-66.93	0.52	PK
4	6949	-63.54	-47.00	-16.54	-67.77	4.23	PK
5	8525	-61.66	-47.00	-14.66	-71.20	9.54	PK
* 6	9952	-58.85	-47.00	-11.85	-71.62	12.77	PK

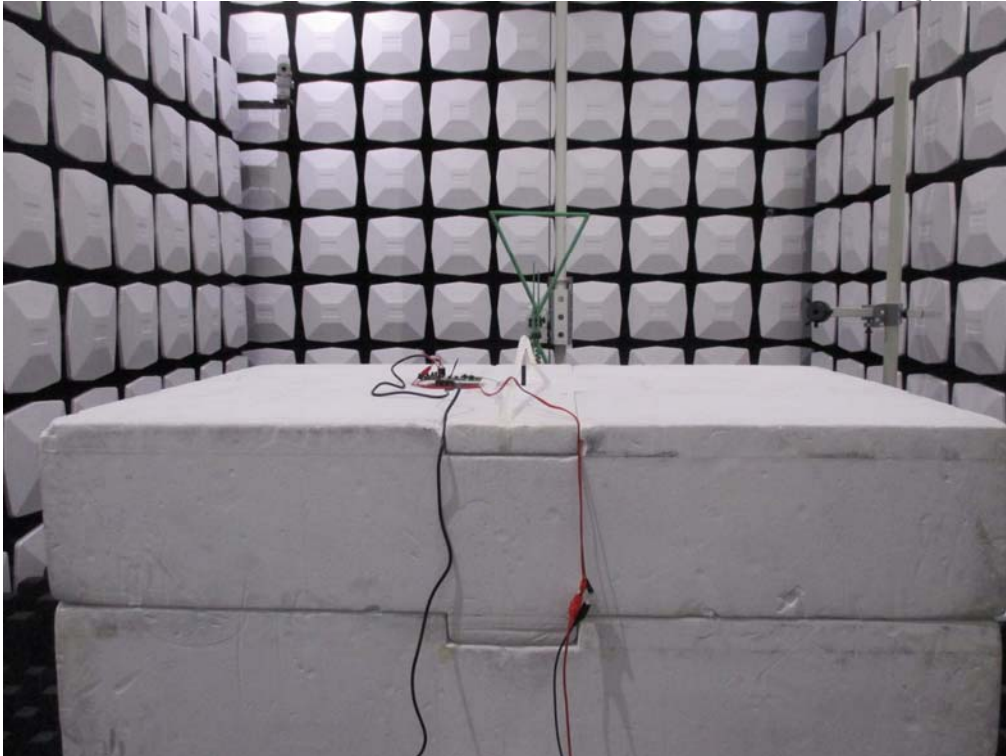
Note:

1. All reading levels is Peak value.
2. “ * ”, means this data is the worst value.
3. Emission Level = Reading Level + Correct Factor.
4. The emission above 13GHz were not included is because their levels are too low.

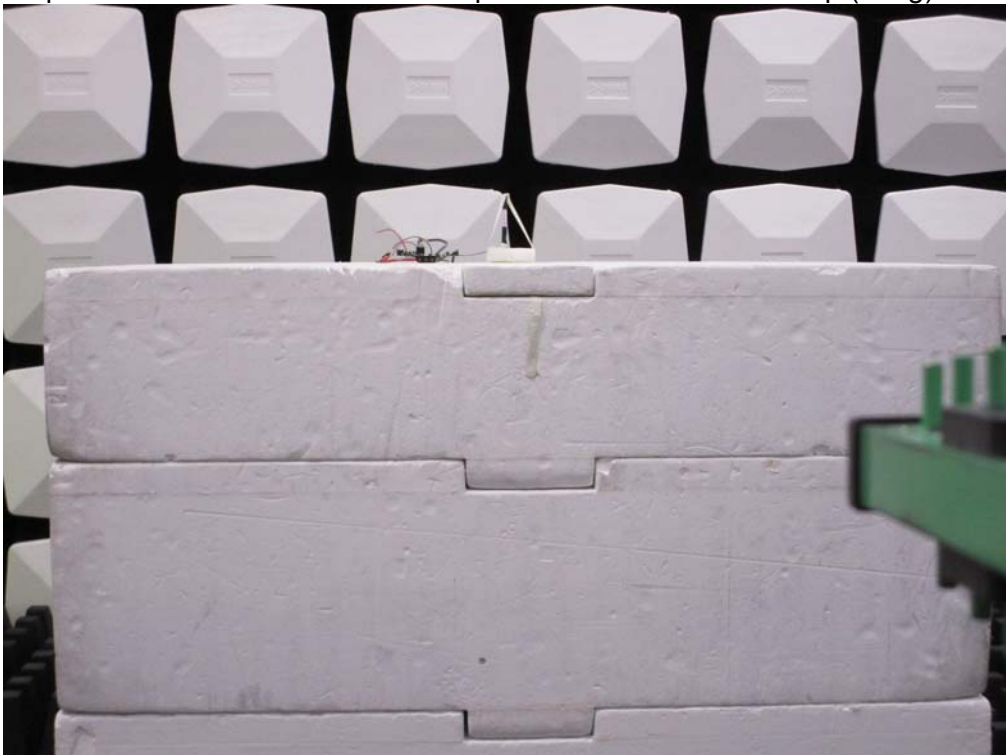
7.7. Test Photo

Test Mode : Mode 6: Receive Mode_External Dipole Ant.

Description : Front View of Receiver spurious emission Test Setup (Bilog)

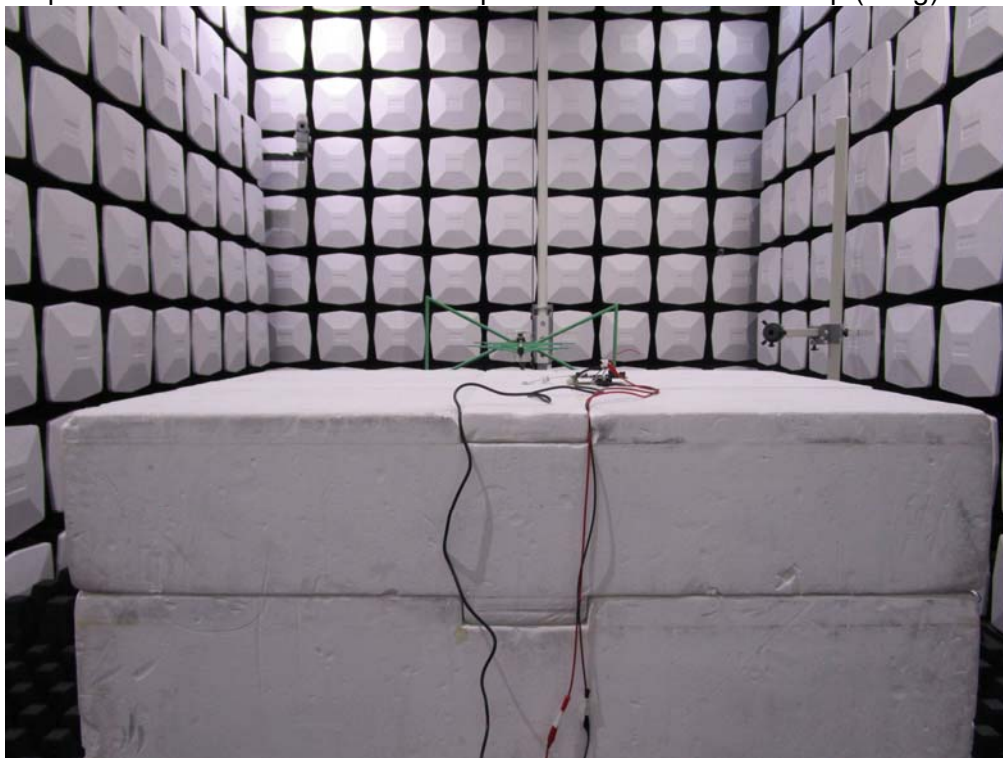


Description : Back View of Receiver spurious emission Test Setup (Bilog)



Test Mode : Mode 7: Receive Mode_External PCB Ant.

Description : Front View of Receiver spurious emission Test Setup (Bilog)



Description : Back View of Receiver spurious emission Test Setup (Bilog)

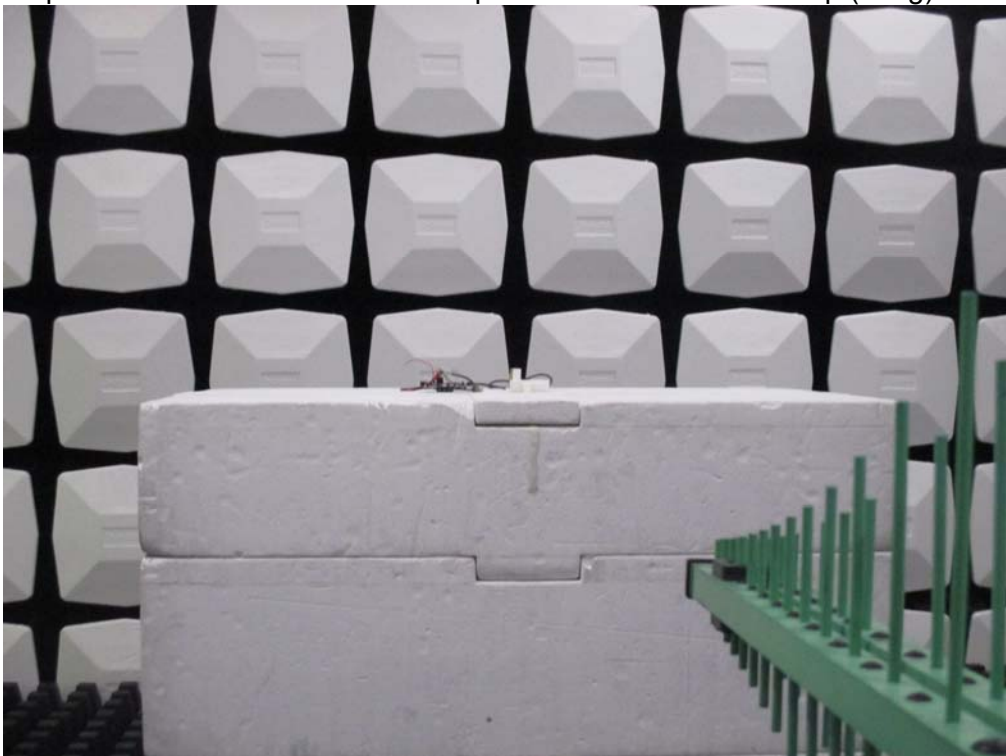


Test Mode : Mode 8: Receive Mode_External PIFA Ant.

Description : Front View of Receiver spurious emission Test Setup (Bilog)

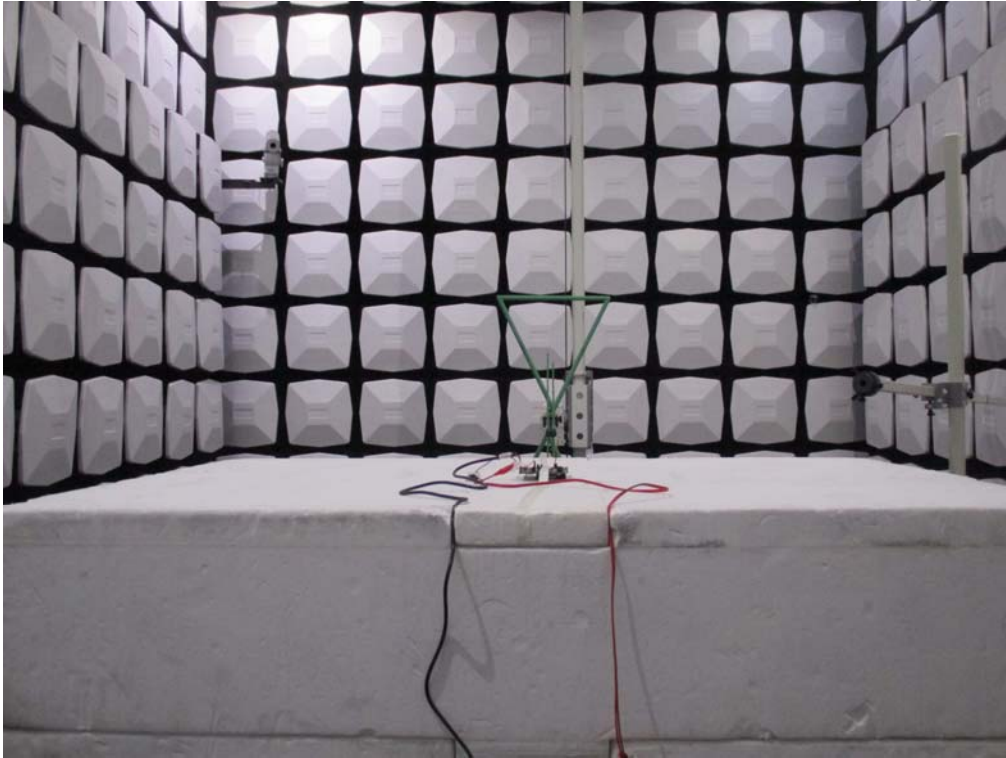


Description : Back View of Receiver spurious emission Test Setup (Bilog)

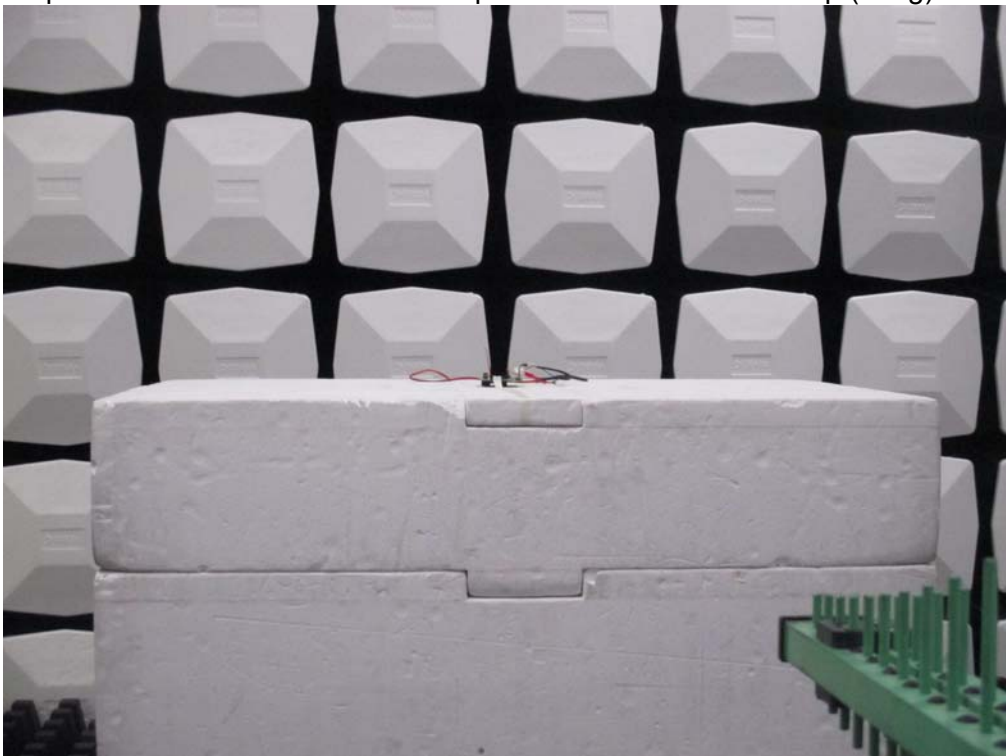


Test Mode : Mode 9: Receive Mode_Internal PCB Ant.

Description : Front View of Receiver spurious emission Test Setup (Bilog)

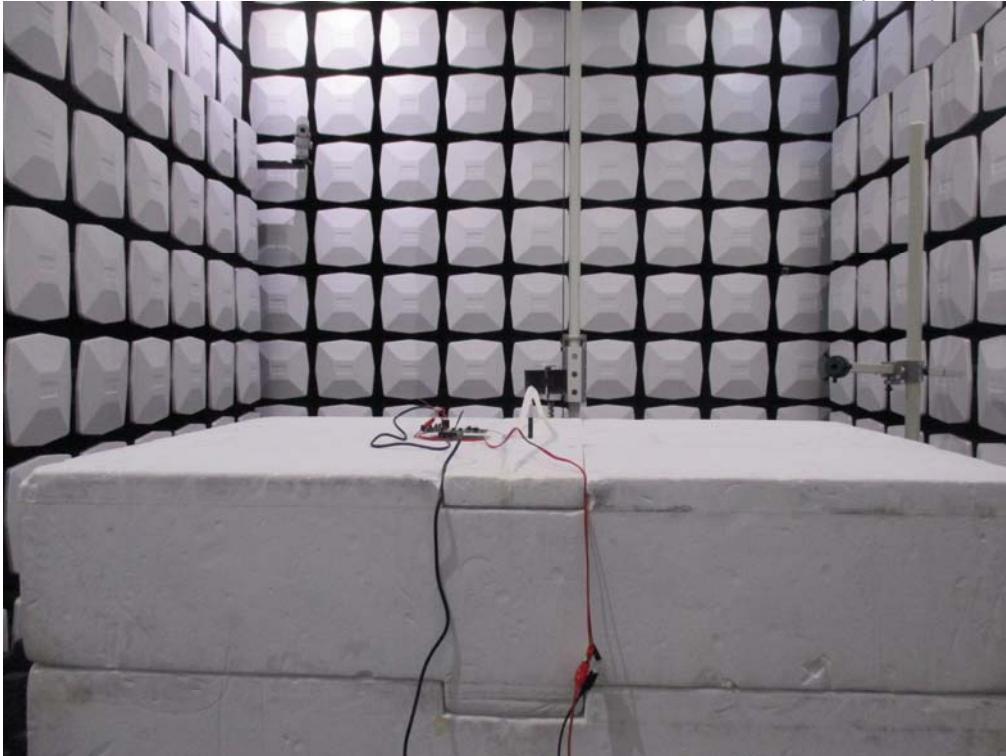


Description : Back View of Receiver spurious emission Test Setup (Bilog)



Test Mode : Mode 6: Receive Mode_External Dipole Ant.

Description : Front View of Receiver spurious emission Test Setup (Horn)

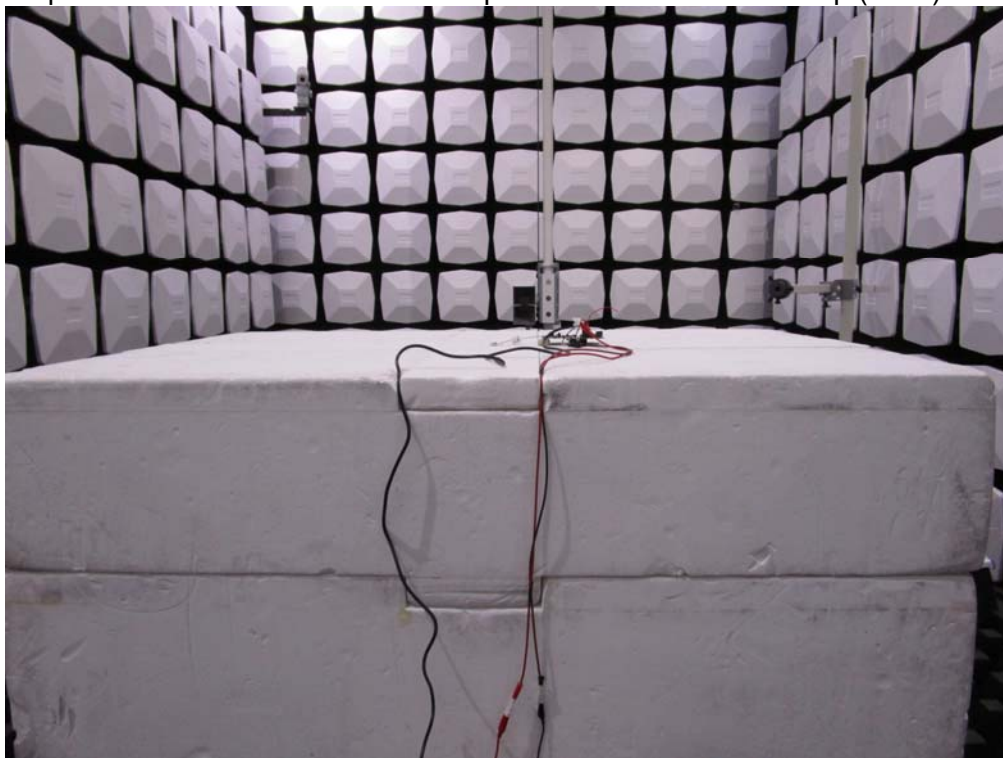


Description : Back View of Receiver spurious emission Test Setup (Horn)



Test Mode : Mode 7: Receive Mode_External PCB Ant.

Description : Front View of Receiver spurious emission Test Setup (Horn)

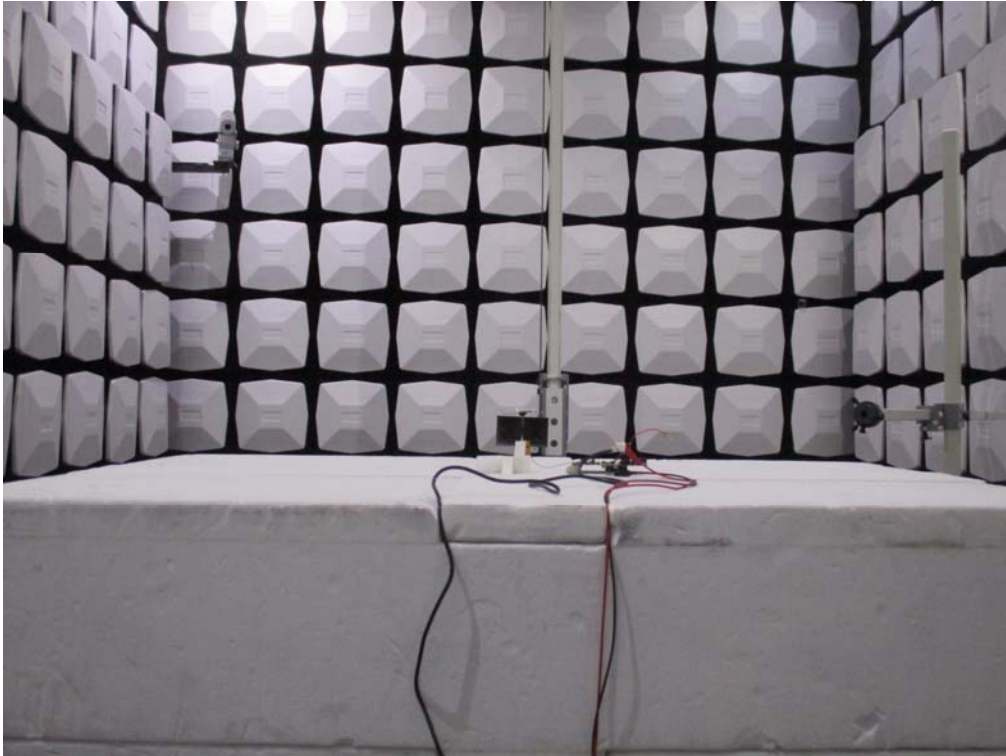


Description : Back View of Receiver spurious emission Test Setup (Horn)



Test Mode : Mode 8: Receive Mode_External PIFA Ant.

Description : Front View of Receiver spurious emission Test Setup (Horn)

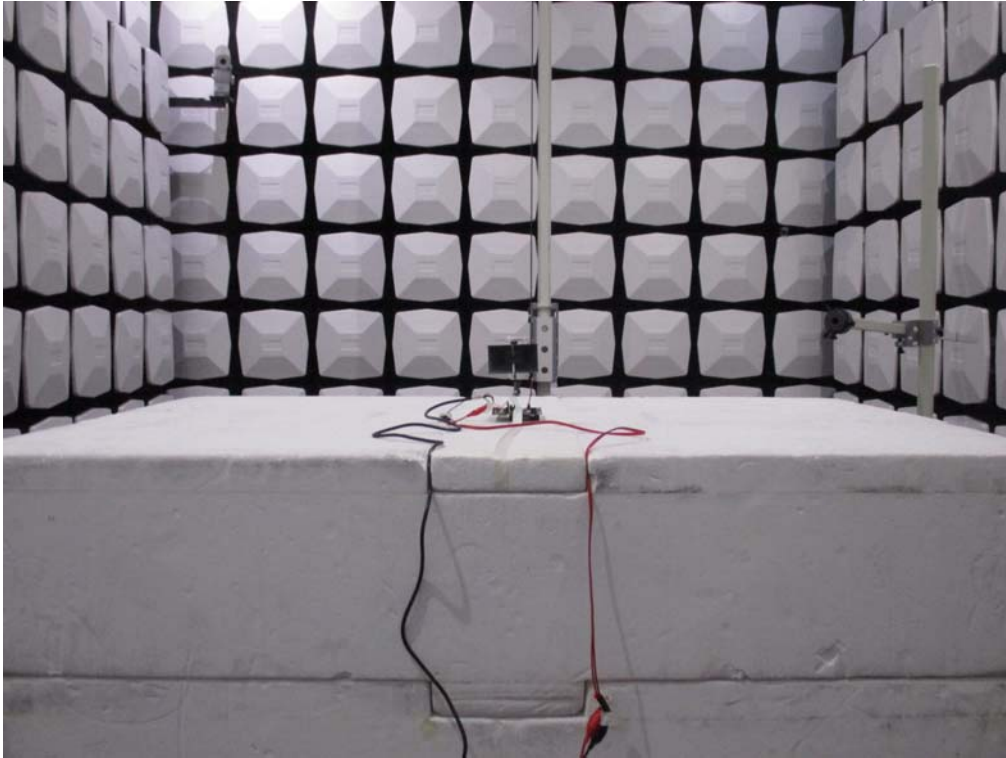


Description : Back View of Receiver spurious emission Test Setup (Horn)



Test Mode : Mode 9: Receive Mode_Internal PCB Ant.

Description : Front View of Receiver spurious emission Test Setup (Horn)

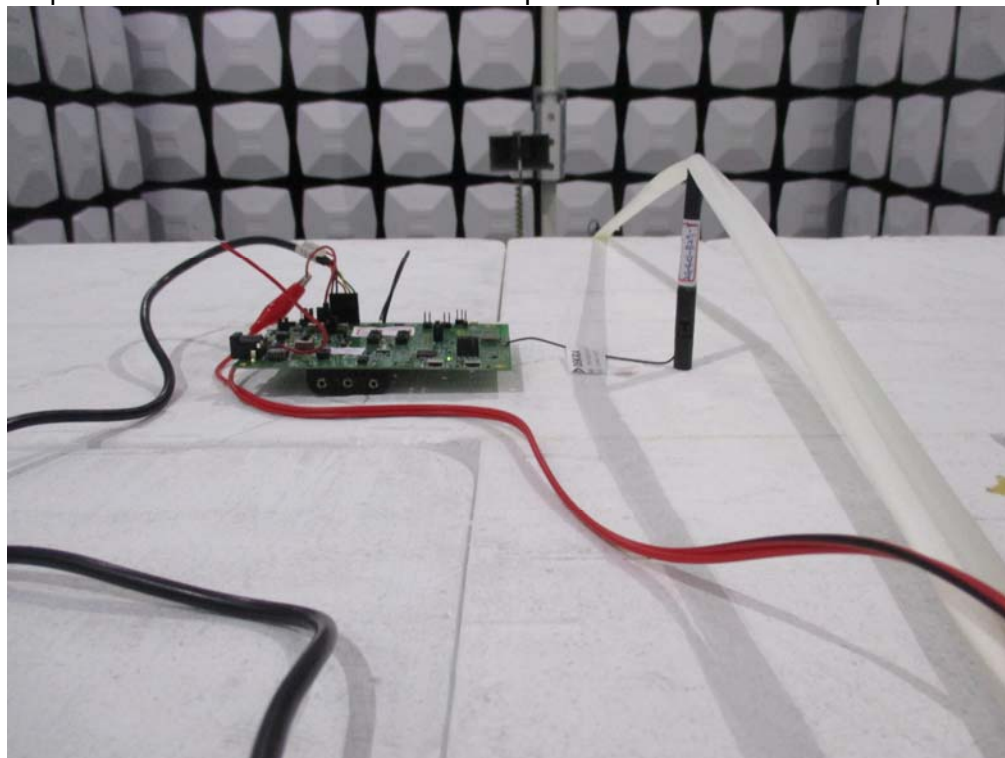


Description : Back View of Receiver spurious emission Test Setup (Horn)



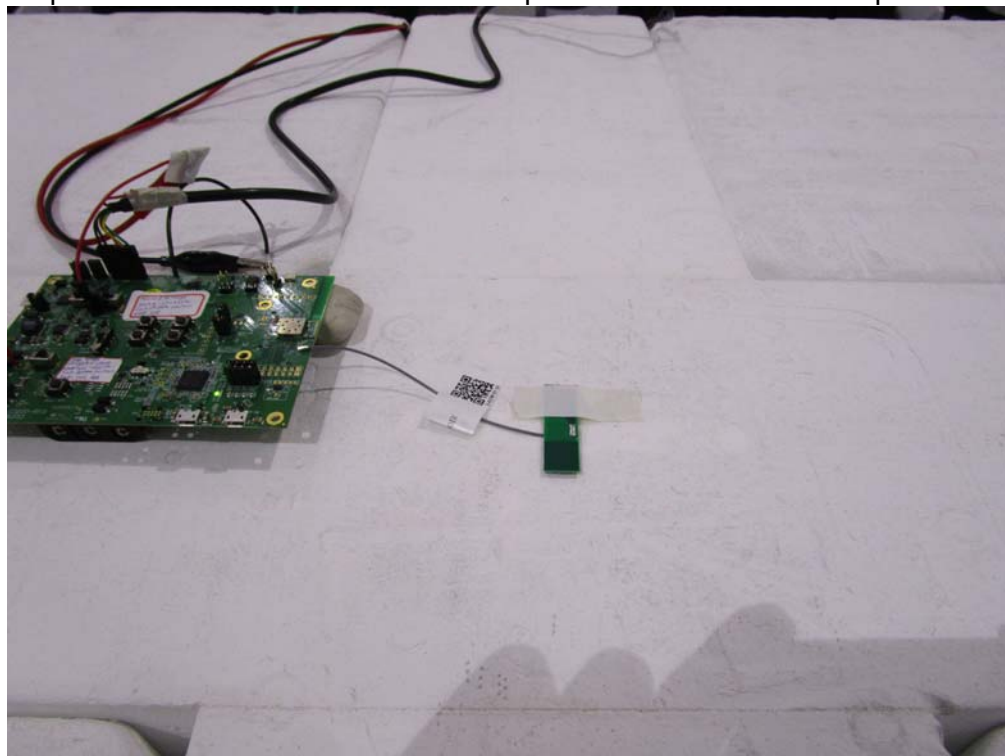
Test Mode : Mode 6: Receive Mode_External Dipole Ant.

Description : Detailed View of Receiver spurious emission Test Setup



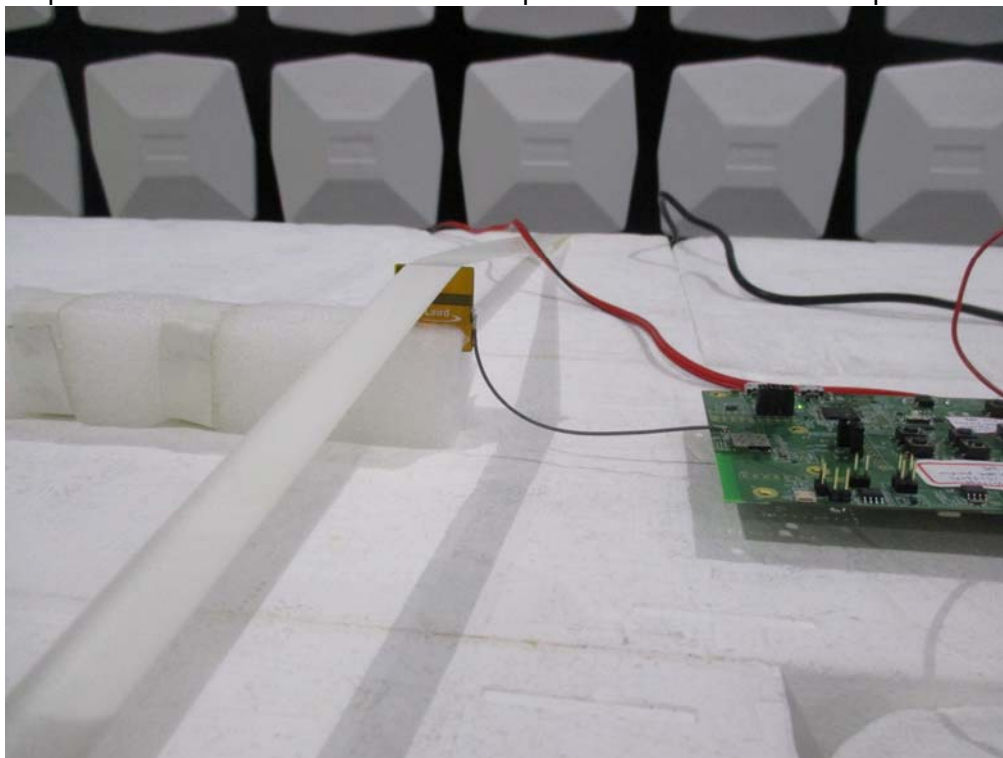
Test Mode : Mode 7: Receive Mode_External PCB Ant.

Description : Detailed View of Receiver spurious emission Test Setup



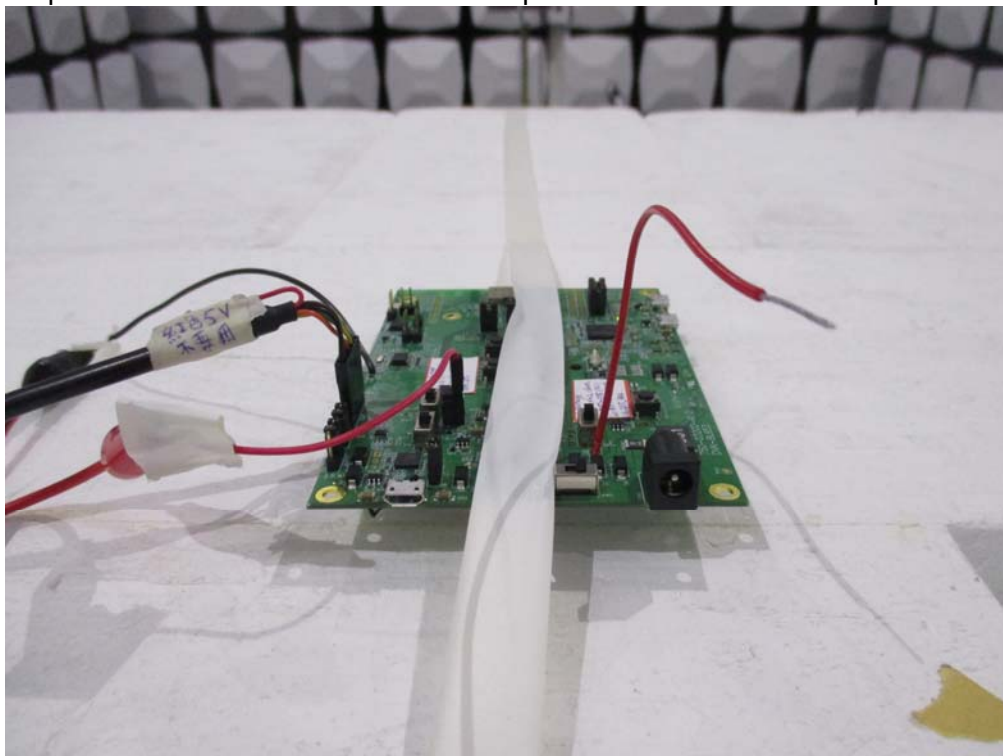
Test Mode : Mode 8: Receive Mode_External PIFA Ant.

Description : Detailed View of Receiver spurious emission Test Setup



Test Mode : Mode 9: Receive Mode_Internal PCB Ant.

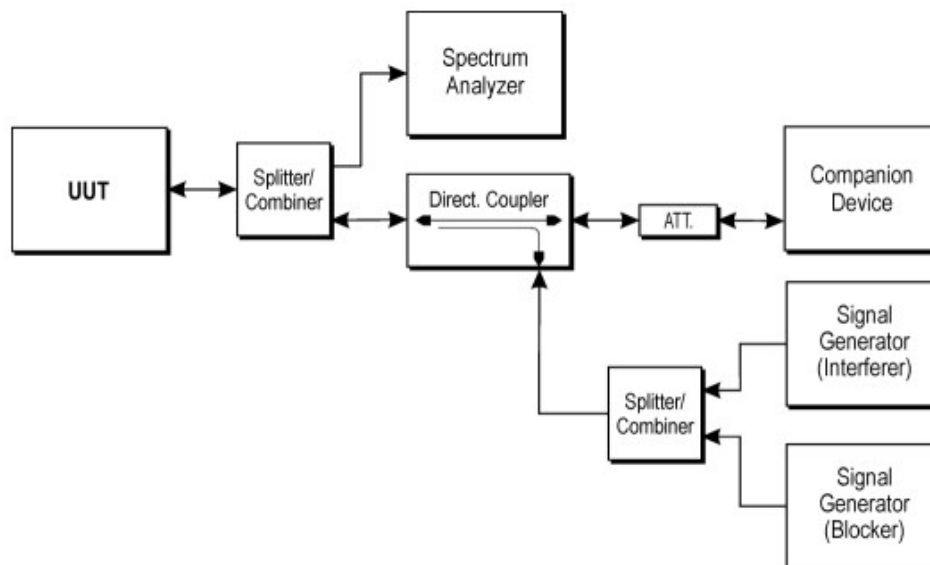
Description : Detailed View of Receiver spurious emission Test Setup



8. Adaptivity

8.1. Test Setup

Conducted measurements:



8.2. Test Condition

Normal test conditions

8.3. Limit

Adaptivity Limit	
<input type="checkbox"/>	<p>Adaptive Frequency Hopping using LBT based DAA</p> <p>The CCA observation time shall be not less than 0,2 % of the Channel Occupancy Time with a minimum of 18 μs.</p> <p>Idle Period of minimum 5 % of the Channel Occupancy Time with a minimum of 100μs.</p> <p>Detection threshold level</p> <p>TL = -70 dBm/MHz + (20 dBm - Pout e.i.r.p.)/1 MHz (Pout in dBm).</p>
<input type="checkbox"/>	<p>Adaptive Frequency Hopping using other forms of DAA (non-LBT based)</p> <ul style="list-style-type: none"> ● The Channel Occupancy Time for a given hopping frequency shall be less than ● 40ms. <p>For equipment using a dwell time > 40 ms that want to have other transmissions during the same hop (dwell time) an Idle Period (no transmissions) of minimum 5 % of the Channel Occupancy Period with a minimum of 100 μs</p> <p>Detection threshold level =</p> <p>TL = -70 dBm/MHz + (20 dBm - Pout e.i.r.p.)/1 MHz (Pout in dBm)</p>
<input type="checkbox"/>	<p>LBT based Detect and Avoid(Frame Based Equipment)</p> <p>The CCA observation time shall be not less than 18 μs;</p> <p>The Channel Occupancy Time shall be in the range 1 ms to 10 ms followed by an Idle Period of at least 5 % of the Channel Occupancy Time used in the equipment for the current Fixed Frame Period.</p> <p>Detection threshold level</p> <p>TL = -70 dBm/MHz + (20 dBm - Pout e.i.r.p.)/1 MHz (Pout in dBm).</p>
<input type="checkbox"/>	<p>LBT based Detect and Avoid(Load Based Equipment)</p> <p>The CCA observation time shall be not less than 18 μs;</p> <p>The equipment shall perform an Extended CCA check in which the channel is observed for a random duration in the range between 18 μs and at least 160 μs. Period.</p> <p>Detection threshold level</p> <p>TL = -70 dBm/MHz + (20 dBm - Pout e.i.r.p.)/1 MHz (Pout in dBm).</p>
<input type="checkbox"/>	<p>Short Control Signalling Transmissions:</p> <ul style="list-style-type: none"> ● Short Control Signalling Transmissions shall have a maximum duty cycle of ● TxOn / (TxOn + TxOff) ratio of 10 % within any observation period of 50 ms

8.4. Test Procedure

Refer to ETSI EN 300 328 V2.2.2 (2019-07) Clause 5.4.6

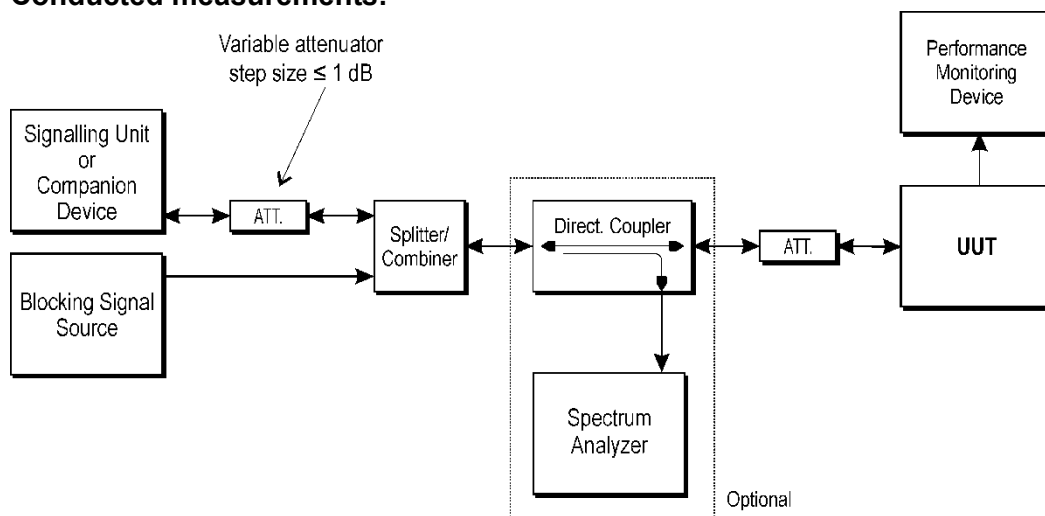
8.5. Test Result

The RF Output Power Level of this equipment is less than +10 dBm EIRP, so this item does not need to be tested.

9. Receiver Blocking

9.1. Test Setup

Conducted measurements:



9.2. Test Condition

Normal test conditions

9.3. Limit

Receiver Category 1:

The following equipment shall be categorized as receiver category 1 equipment:

- Adaptive equipment with a maximum RF output power greater than 10 dBm e.i.r.p.

NOTE: Non-adaptive equipment is categorized as receiver category 2 or receiver category 3.

Table 6: Receiver Blocking parameters for Receiver Category 1 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 4)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 4)	Type of blocking signal
(-133 dBm + 10 × log ₁₀ (OCBW)) or -68 dBm whichever is less (see note 2)	2 380 2 504	-34	CW
(-139 dBm + 10 × log ₁₀ (OCBW)) or -74 dBm whichever is less (see note 3)	2 300 2 330 2 360 2 524 2 584 2 674		
NOTE 1: OCBW is in Hz.			
NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to P _{min} + 26 dB where P _{min} is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.			
NOTE 3: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to P _{min} + 20 dB where P _{min} is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.			
NOTE 4: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.			

Receiver Category 2:

The following equipment shall be categorized as receiver category 2 equipment:

- non-adaptive equipment with a Medium Utilization (MU) factor greater than 1 % and less than or equal to 10 % (irrespective of the maximum RF output power); or
- equipment (adaptive or non-adaptive) with a maximum RF output power greater than 0 dBm e.i.r.p. and less than or equal to 10 dBm e.i.r.p.

Table 7: Receiver Blocking parameters receiver Category 2 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
(-139 dBm + $10 \times \log_{10}(\text{OCBW}) + 10 \text{ dB}$) or (-74 dBm + 10 dB) whichever is less (see note 2)	2 380 2 504 2 300 2 584	-34	CW
<p>NOTE 1: OCBW is in Hz.</p> <p>NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{\text{min}} + 26 \text{ dB}$ where P_{min} is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.</p> <p>NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.</p>			

Receiver Category 3:

The following equipment shall be categorized as receiver category 3 equipment:

- non-adaptive equipment with a maximum Medium Utilization (MU) factor of 1 % (irrespective of the maximum RF output power); or
- equipment (adaptive or non-adaptive) with a maximum RF output power of 0 dBm e.i.r.p.

Table 8: Receiver Blocking parameters receiver Category 3 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
(-139 dBm + $10 \times \log_{10}(\text{OCBW}) + 20 \text{ dB}$) or (-74 dBm + 20 dB) whichever is less (see note 2)	2 380 2 504 2 300 2 584	-34	CW
<p>NOTE 1: OCBW is in Hz.</p> <p>NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative the test may be performed using a wanted signal up to $P_{\min} + 30 \text{ dB}$ where P_{\min} is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.</p> <p>NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.</p>			

9.4. Test Procedure

Refer to ETSI EN 300 328 V2.2.2 (2019-07) Clause 5.4.11

9.5. Test Result

Product	Bluetooth 5.1 BLE Data Module		
Test Item	Receiver Blocking		
Test Mode	Mode 10: Normal Mode_High Power		
Date of Test	2020/04/06	Test Site	SR10-H
Temperature (°C)	25.0	Humidity (%RH)	51.0

Mode: BLE High Energy / 2402MHz

Blocking signal frequency [MHz]	Pmin [dBm]	Blocking signal power (dBm)	Max PER	Limit
2380	-69	-34	0.00	<10 %
2504			0.00	
2300			0.00	
2584			0.20	

Mode: BLE High Energy / 2480MHz

Blocking signal frequency [MHz]	Pmin [dBm]	Blocking signal power (dBm)	Max PER	Limit
2380	-69	-34	0.00	<10 %
2504			0.00	
2300			0.00	
2584			0.00	

Product	Bluetooth 5.1 BLE Data Module		
Test Item	Receiver Blocking		
Test Mode	Mode 11: Normal Mode_Low Power		
Date of Test	2020/04/09	Test Site	SR10-H
Temperature (°C)	27.0	Humidity (%RH)	49.0

Mode: BLE Low Energy / 2402MHz

Blocking signal frequency [MHz]	Pmin [dBm]	Blocking signal power (dBm)	Max PER	Limit
2380	-59	-34	0.00	<10 %
2504			0.00	
2300			0.00	
2584			0.00	

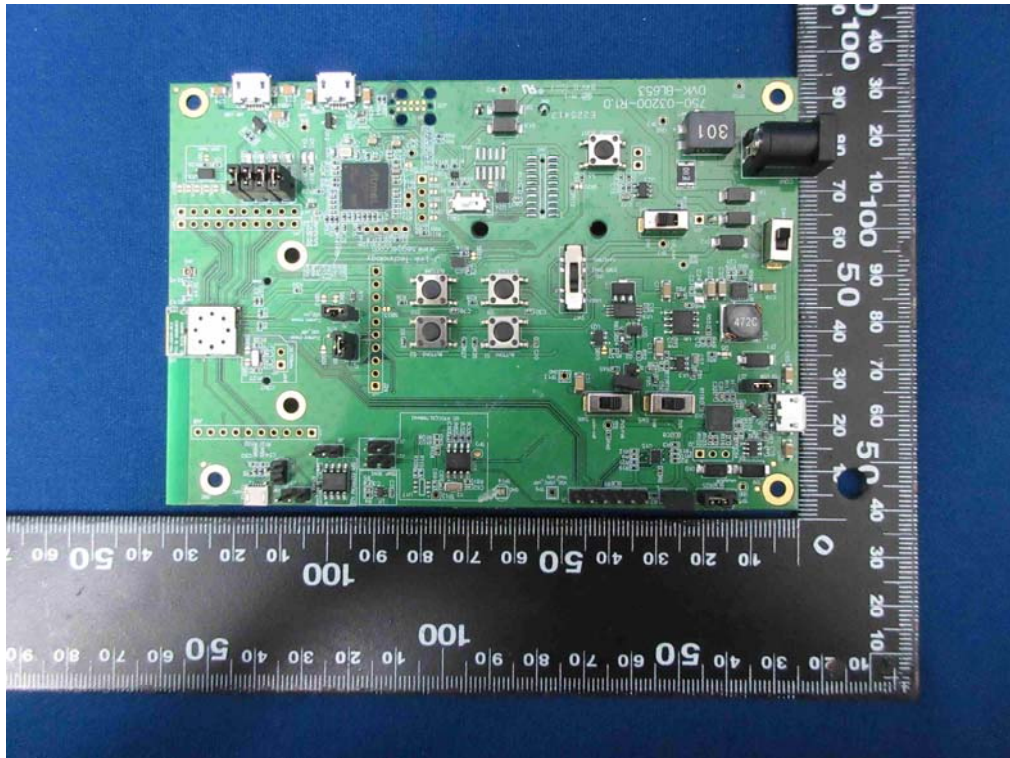
Mode: BLE Low Energy / 2480MHz

Blocking signal frequency [MHz]	Pmin [dBm]	Blocking signal power (dBm)	Max PER	Limit
2380	-59	-34	0.00	<10 %
2504			0.00	
2300			0.00	
2584			0.00	

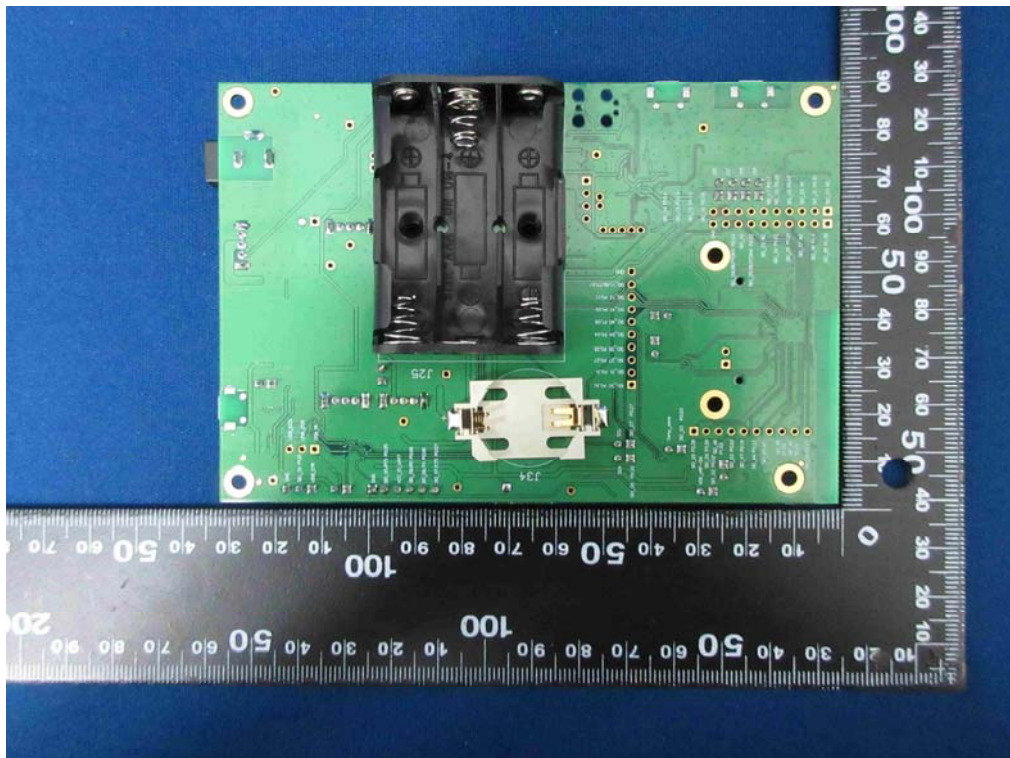
Attachment

➤ EUT Photograph

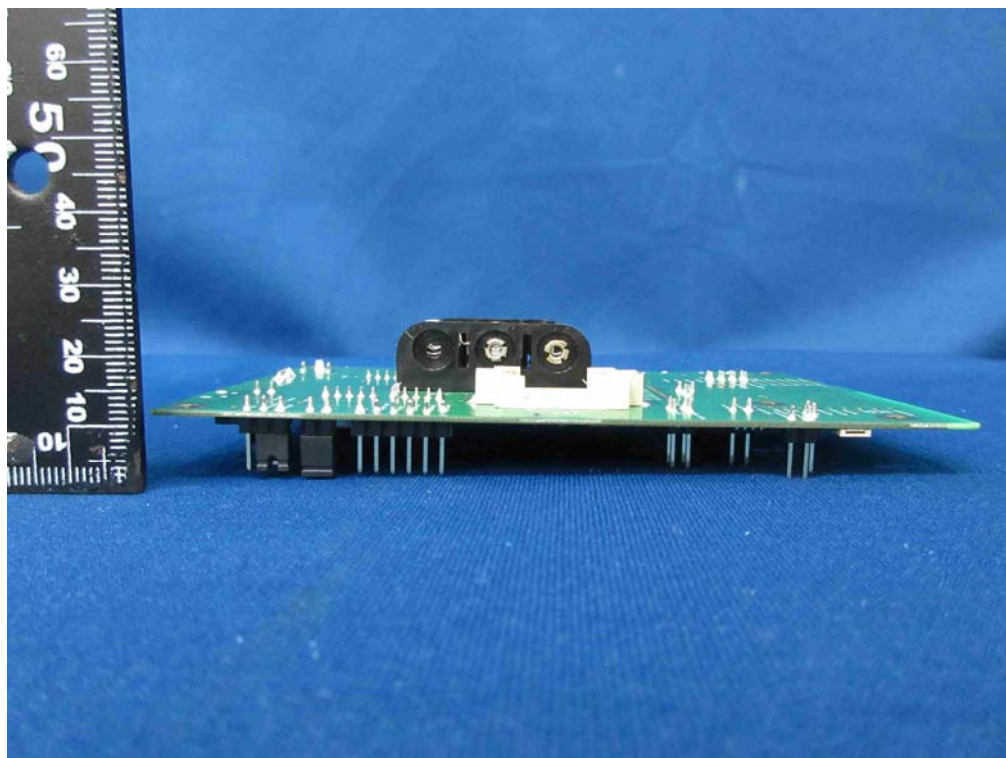
(1) EUT Photo (External Antenna PCB)



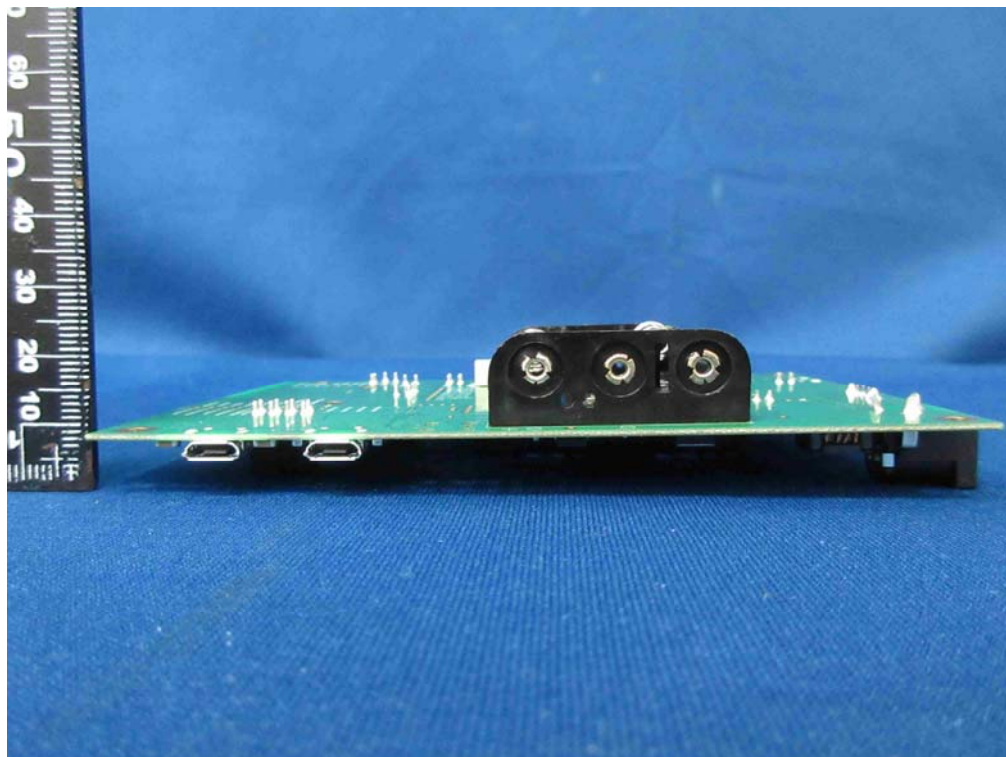
(2) EUT Photo



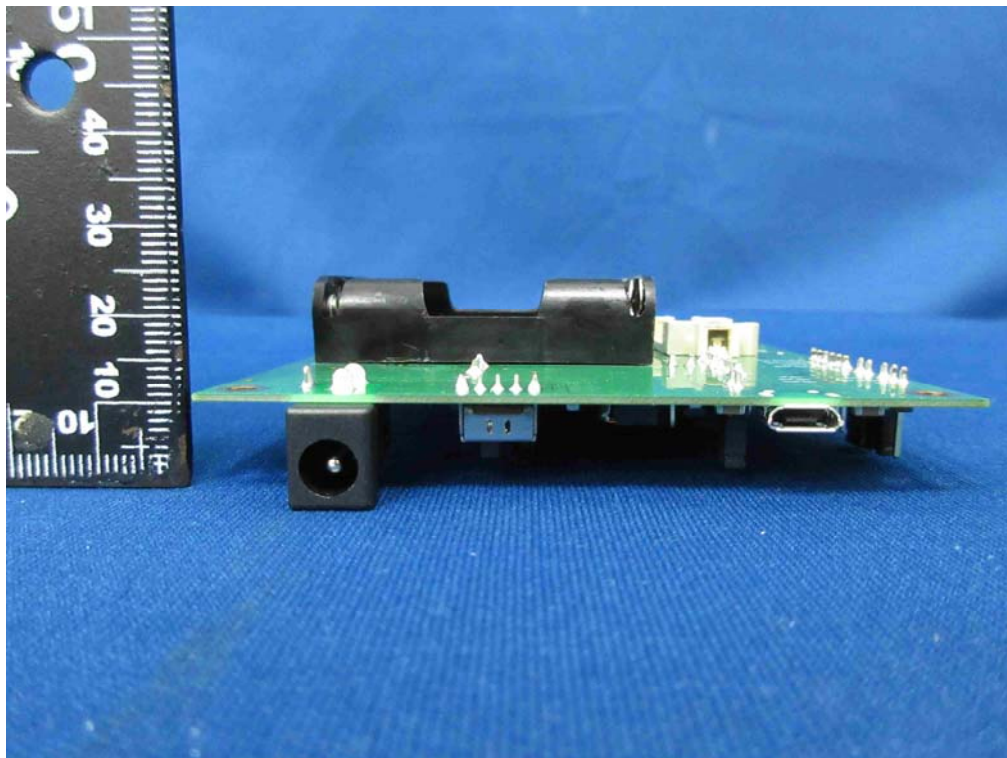
(3) EUT Photo



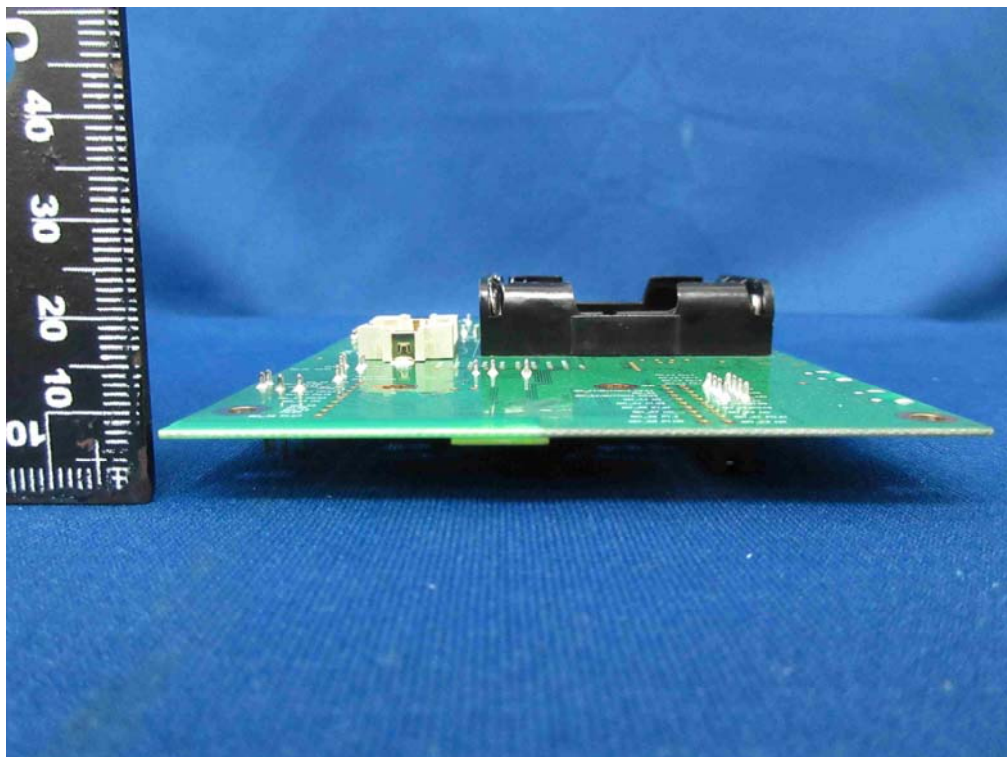
(4) EUT Photo



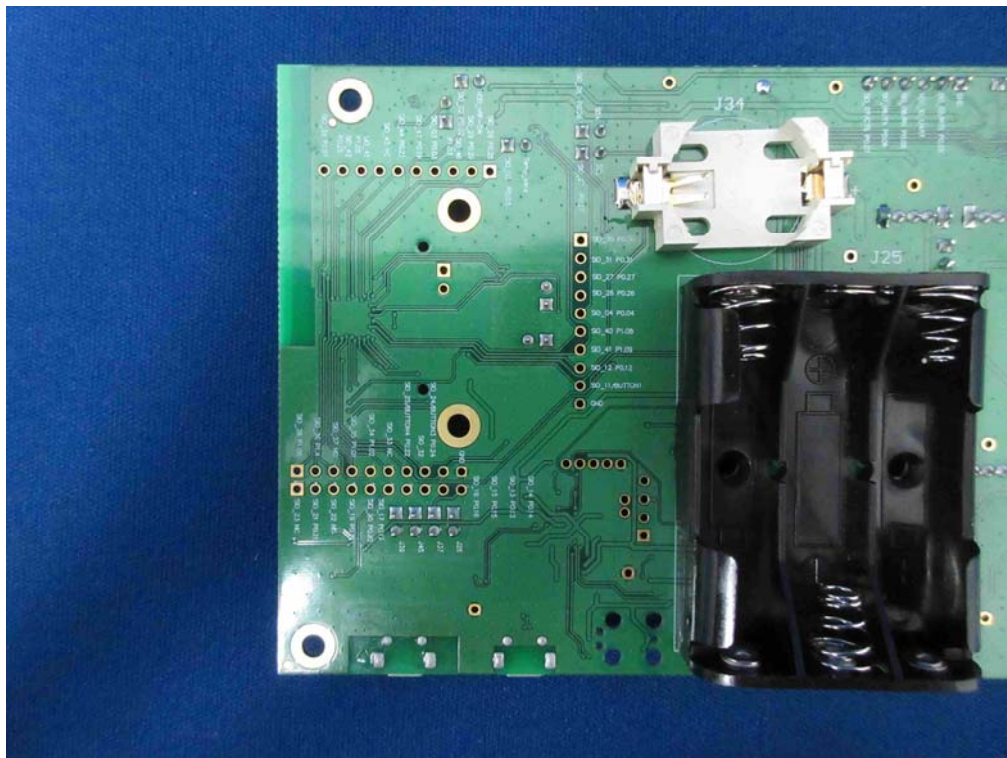
(5) EUT Photo



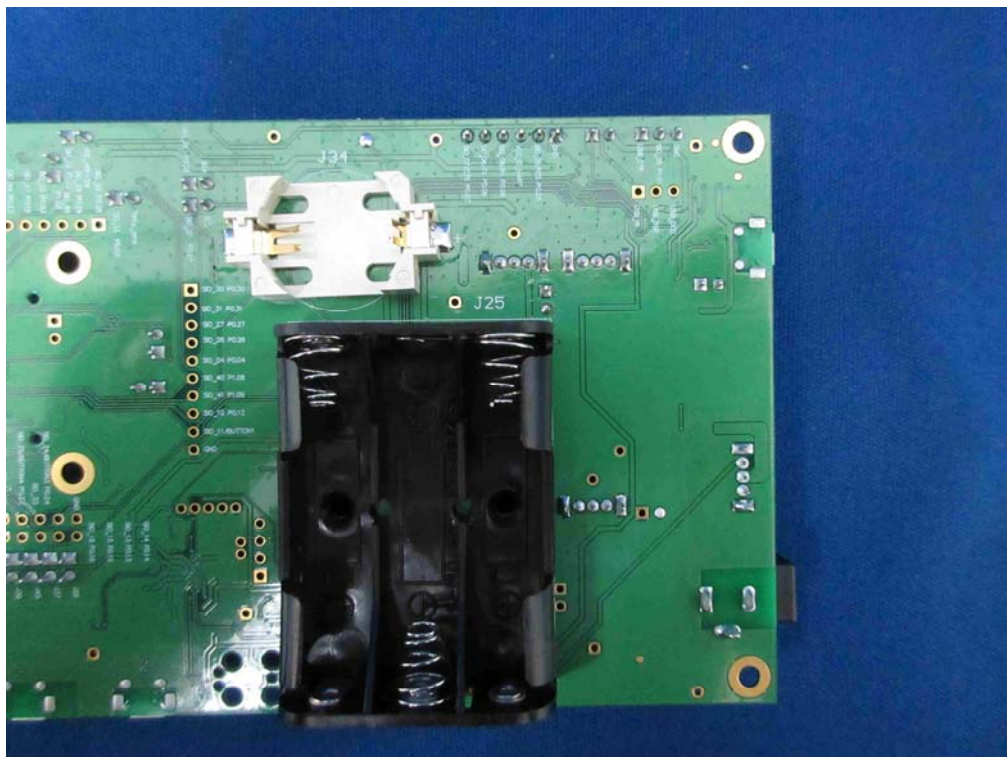
(6) EUT Photo



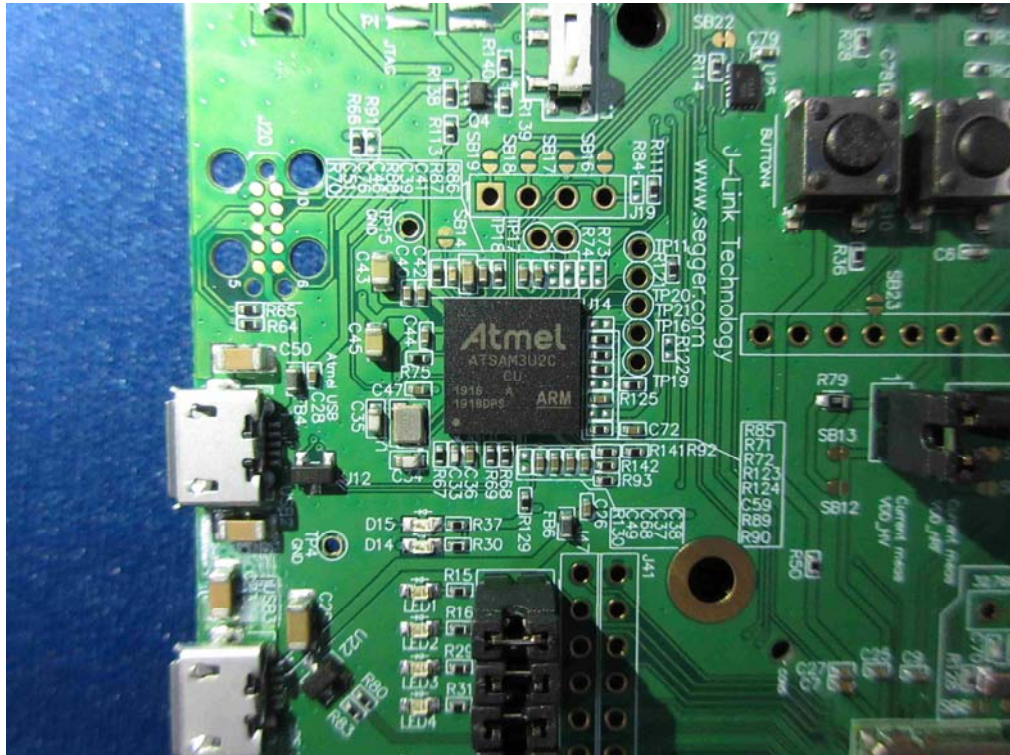
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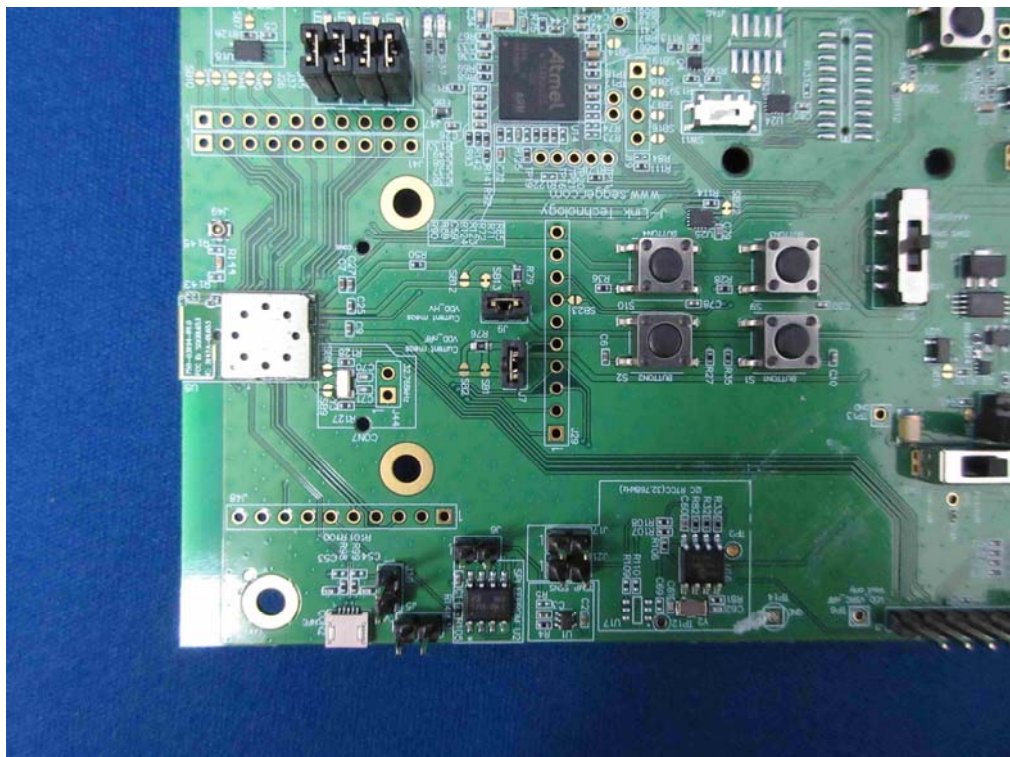
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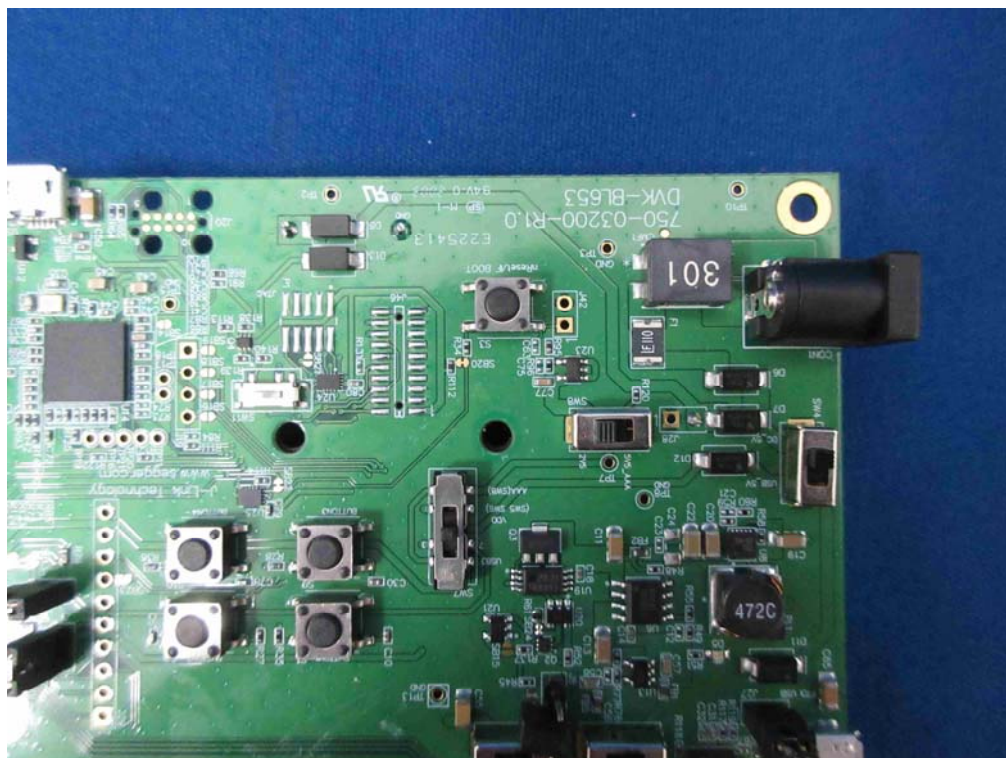
(9) EUT Photo



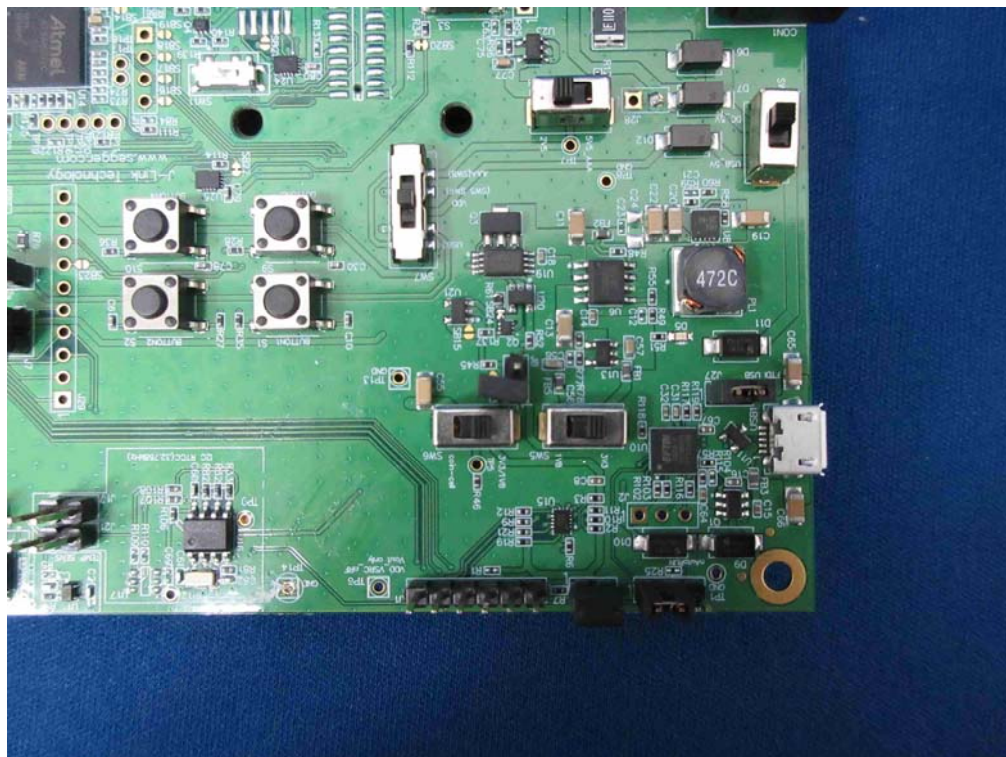
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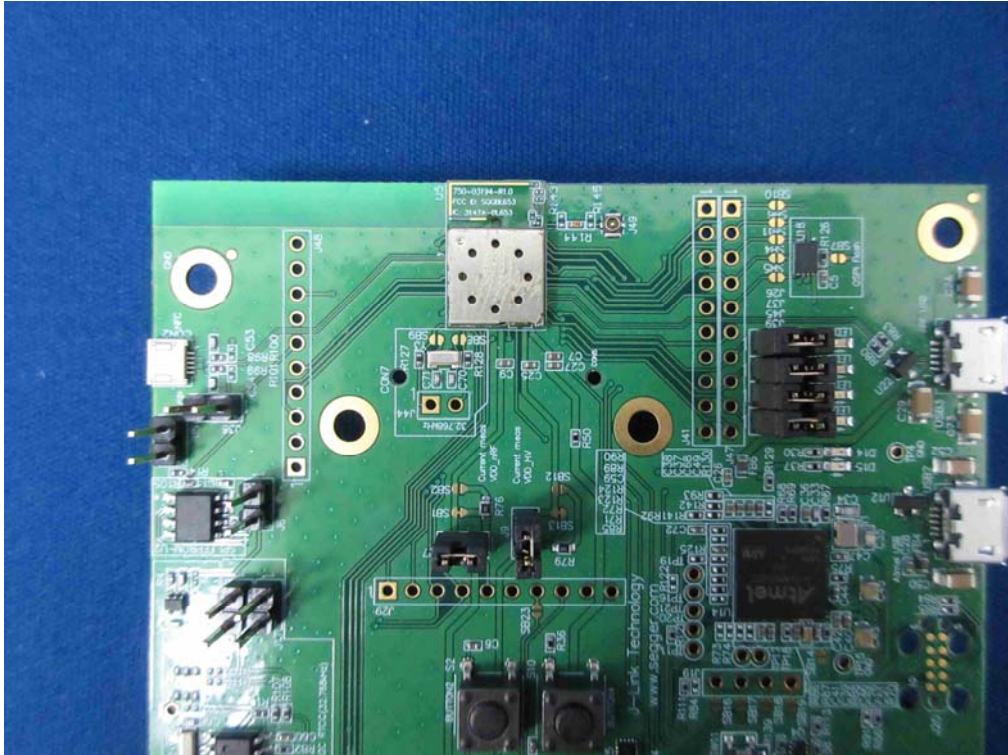
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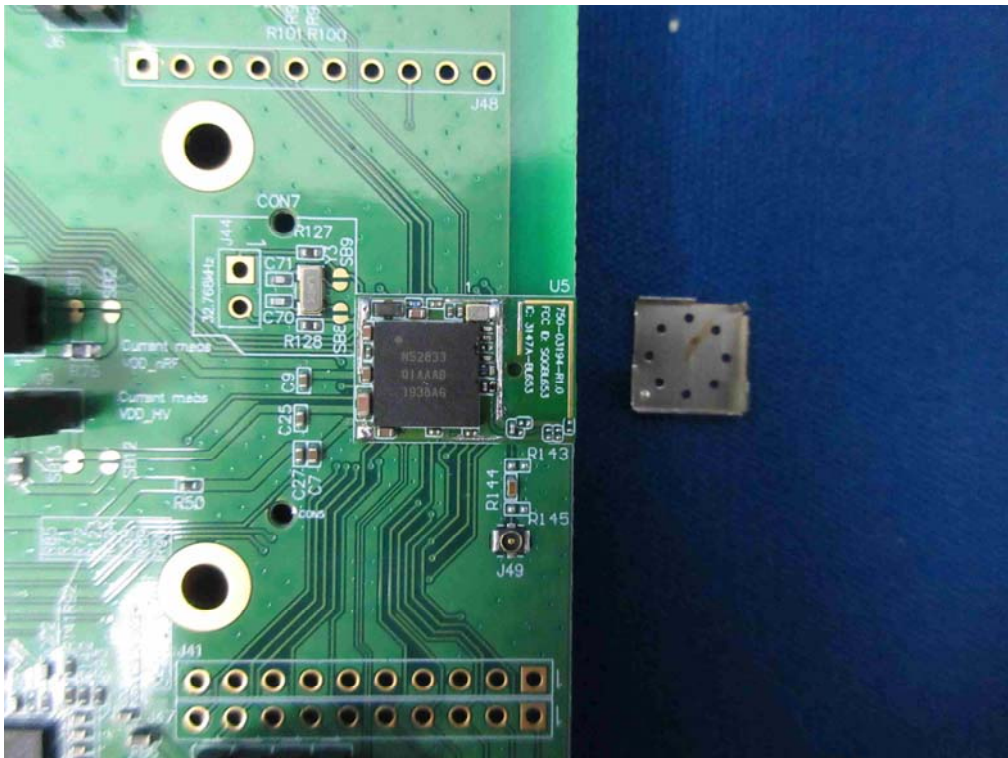
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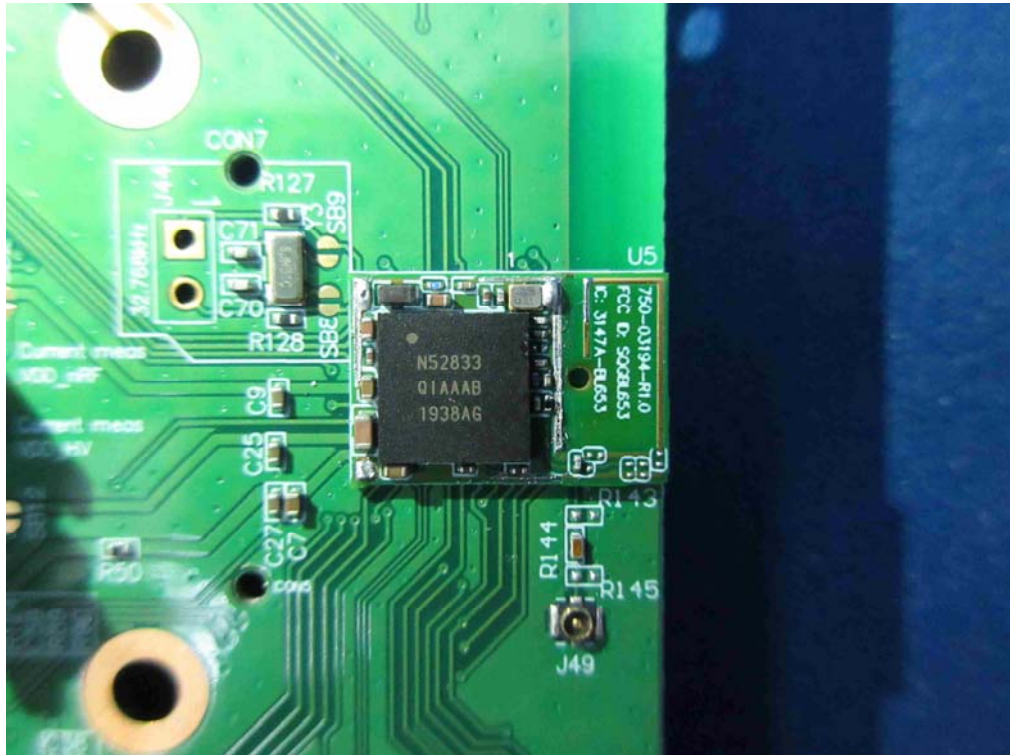
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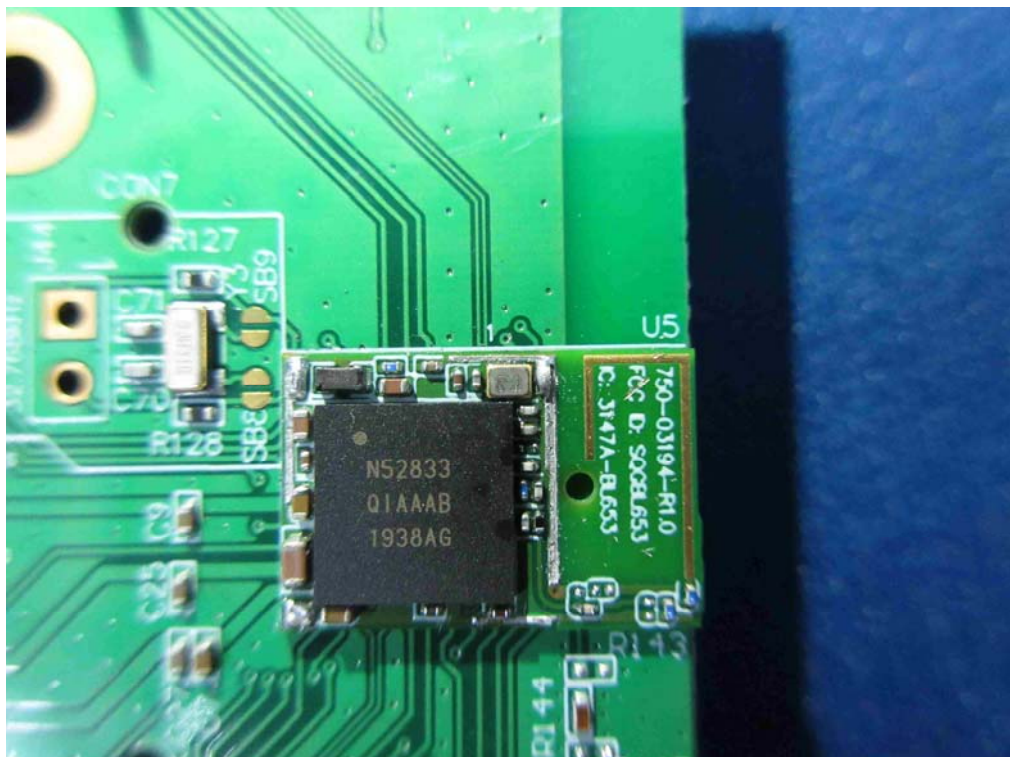
(14) EUT Photo



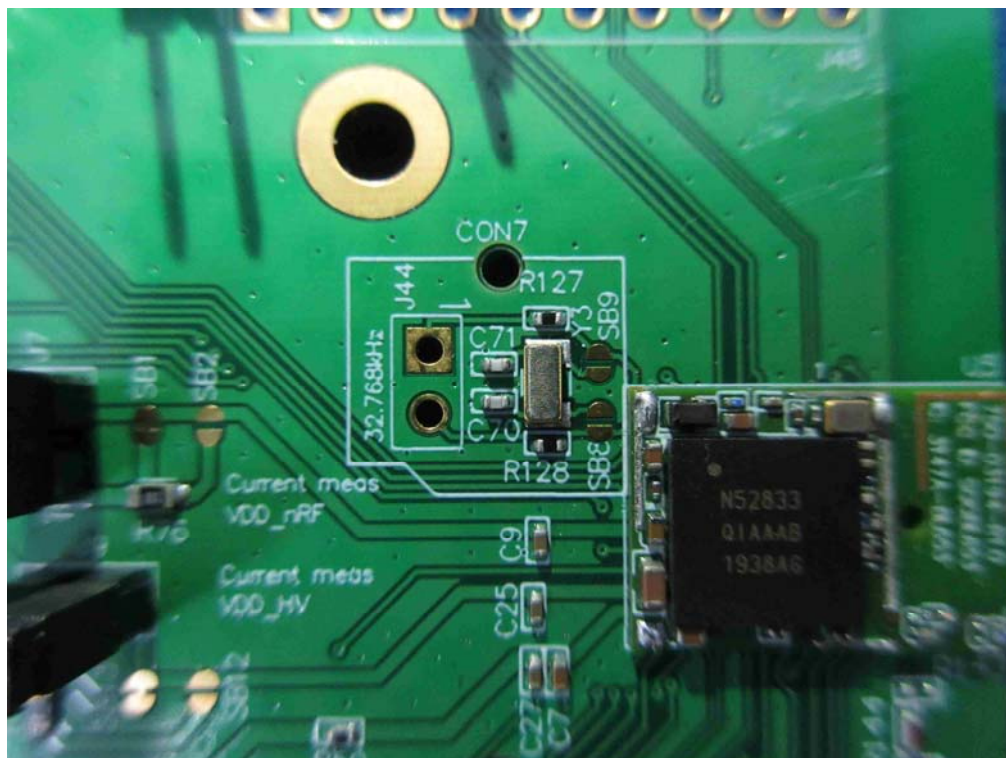
(15) EUT Photo



(16) EUT Photo



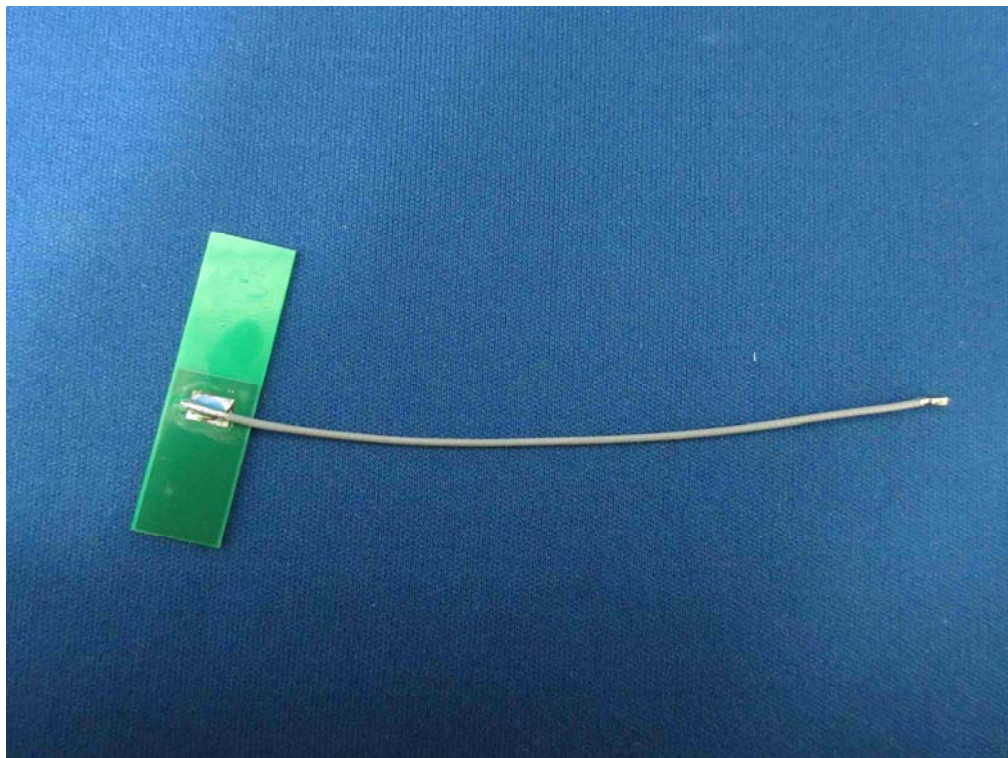
(17) EUT Photo



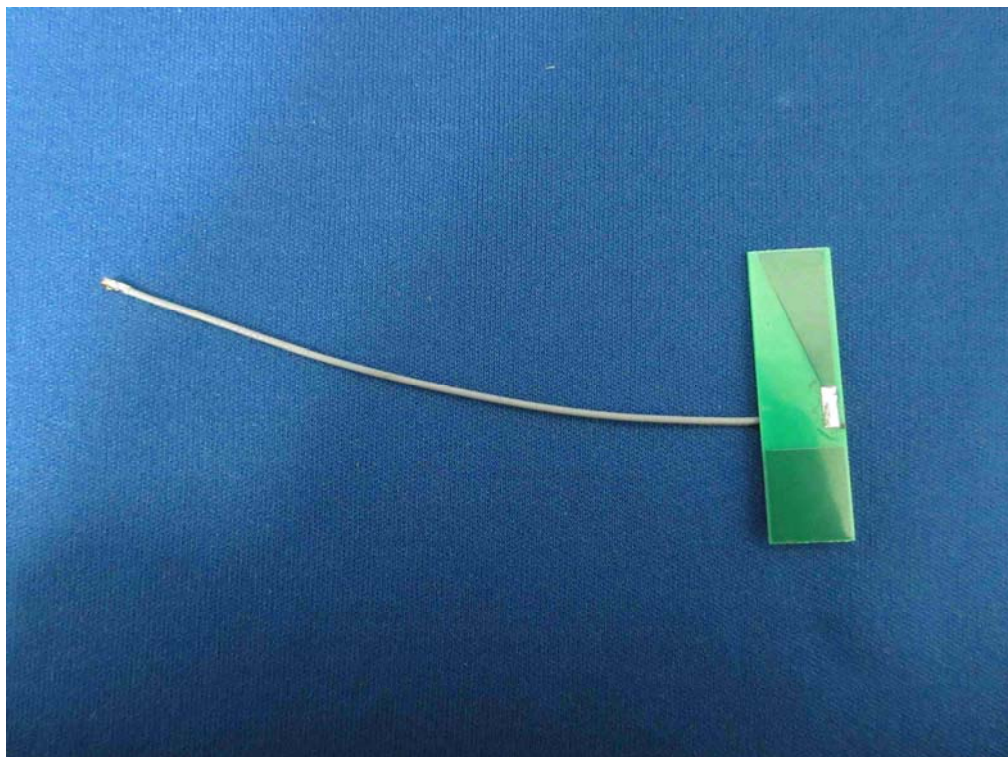
(18) EUT Photo (Antenna)(Mag.Layers, EDA-8709-2G4C1-B27-CY)



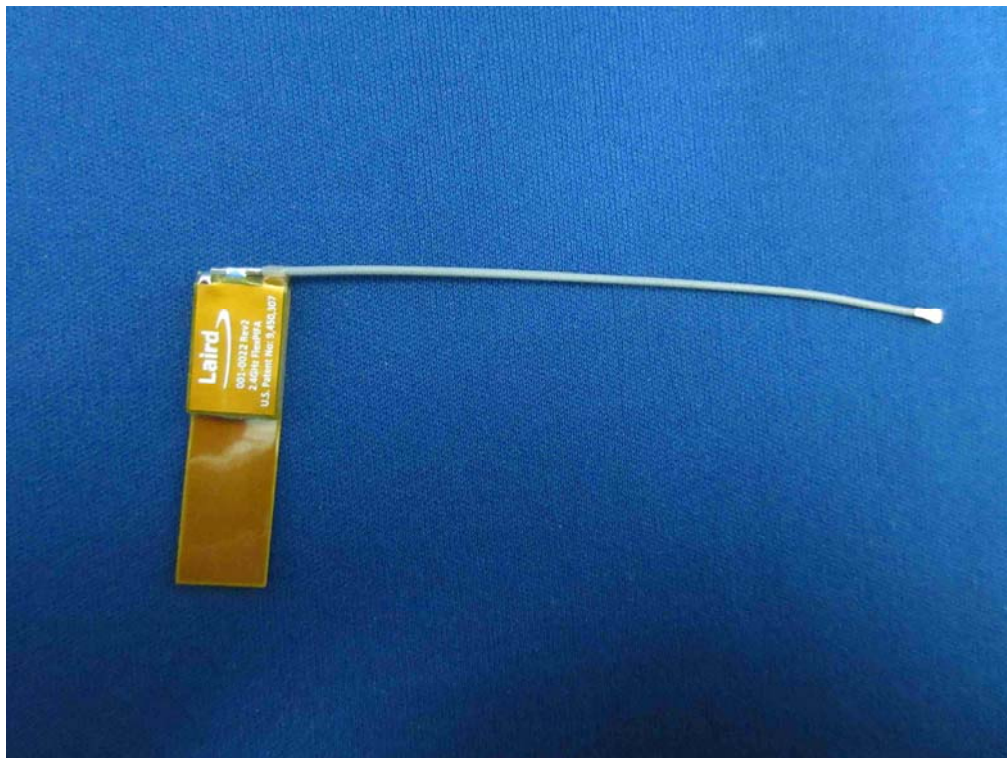
(19) EUT Photo (Antenna)(Laird, NanoBlue)



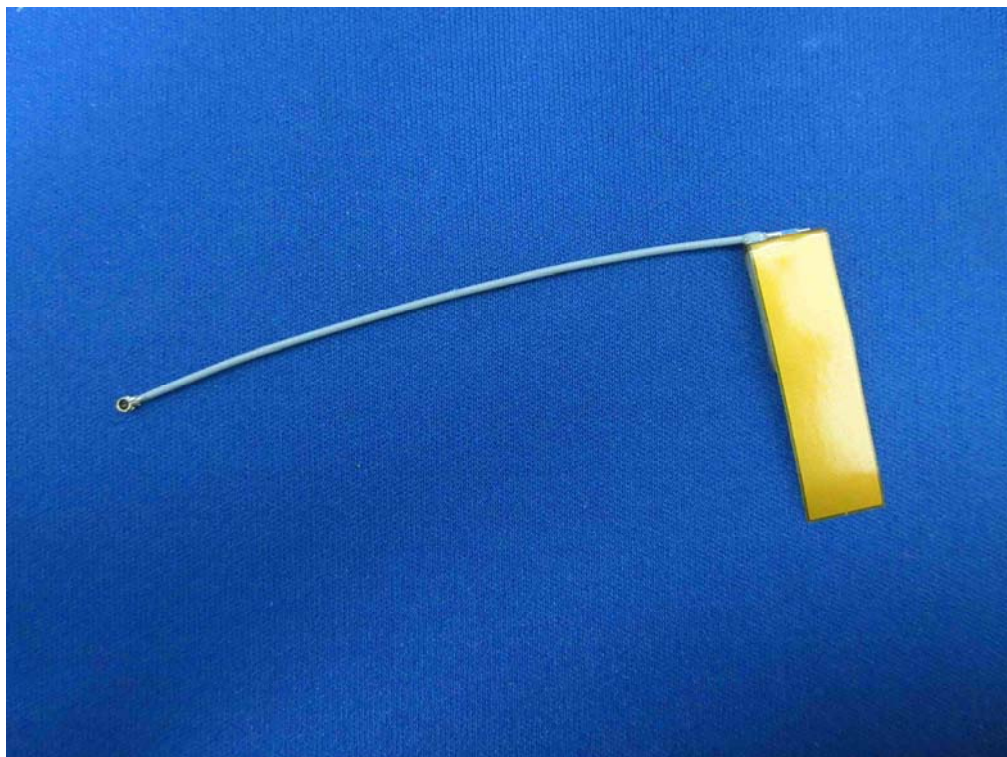
(20) EUT Photo



(21) EUT Photo (Antenna)(Laird, FlexPIFA)



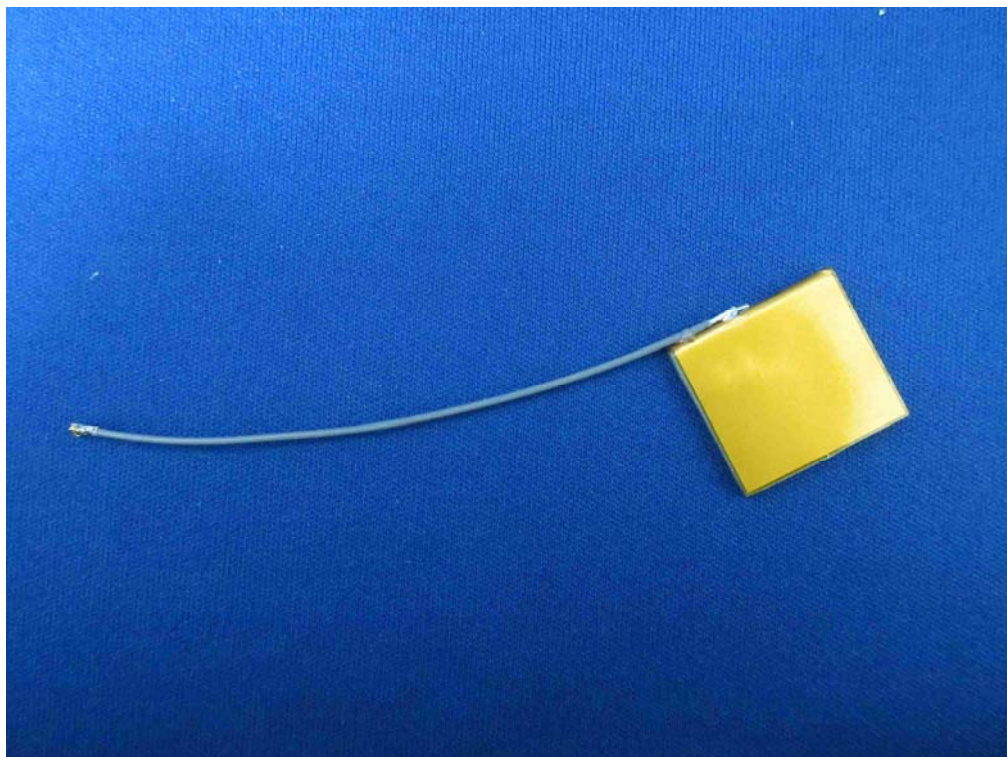
(22) EUT Photo



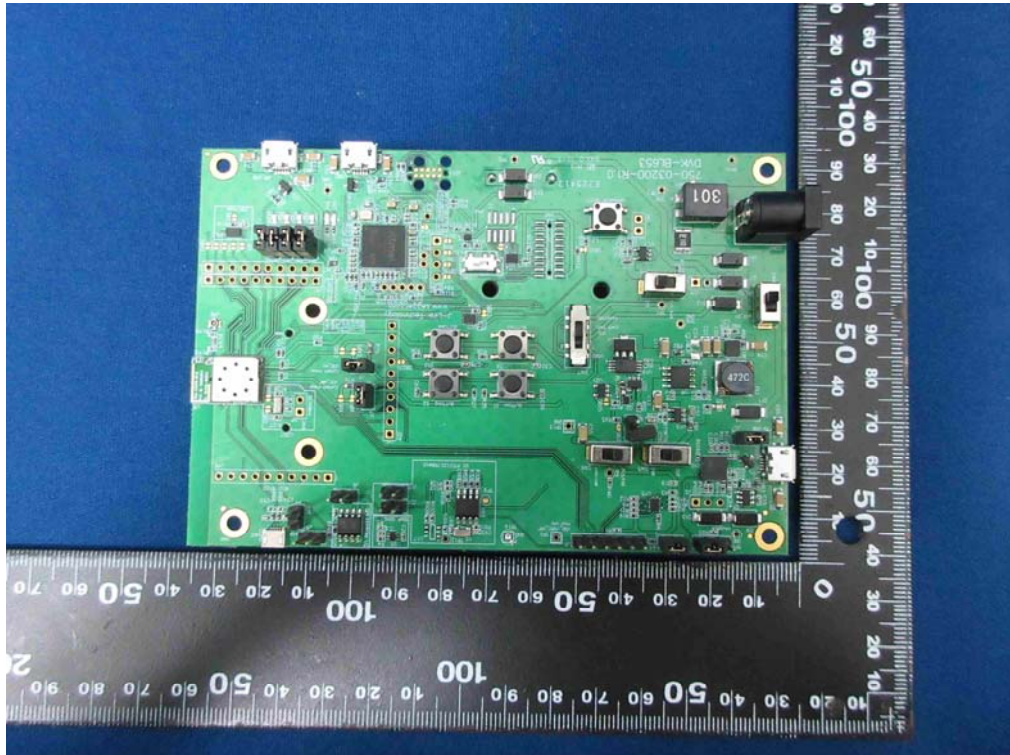
(23) EUT Photo (Antenna)(Laird, mFlexPIFA)



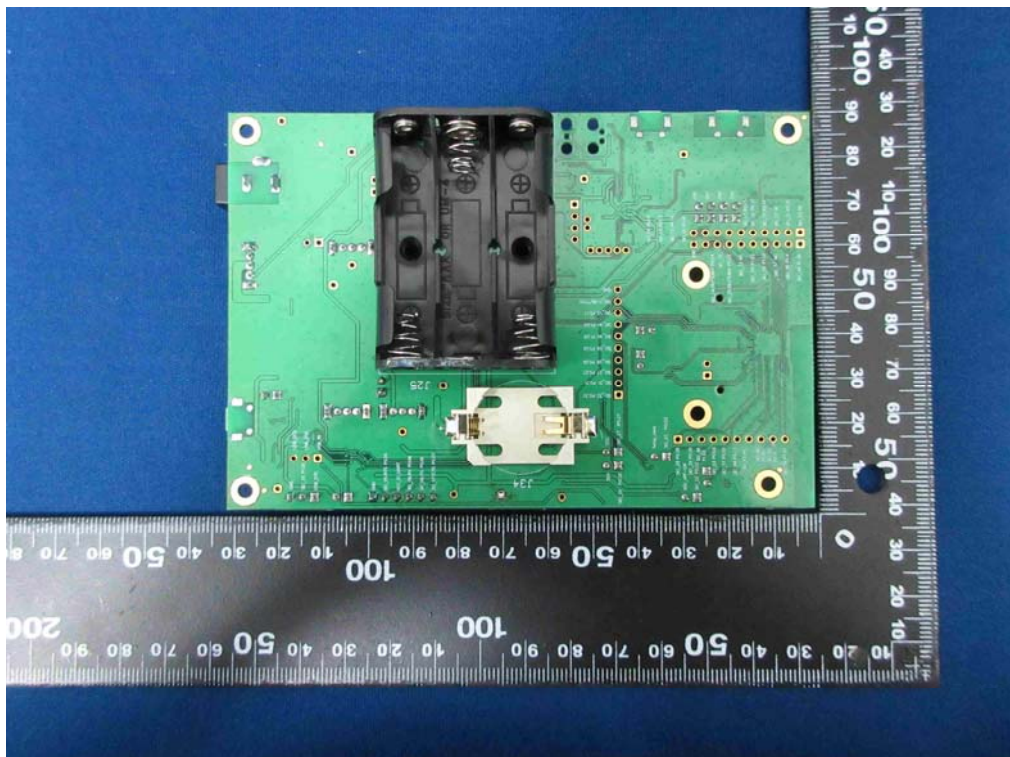
(24) EUT Photo



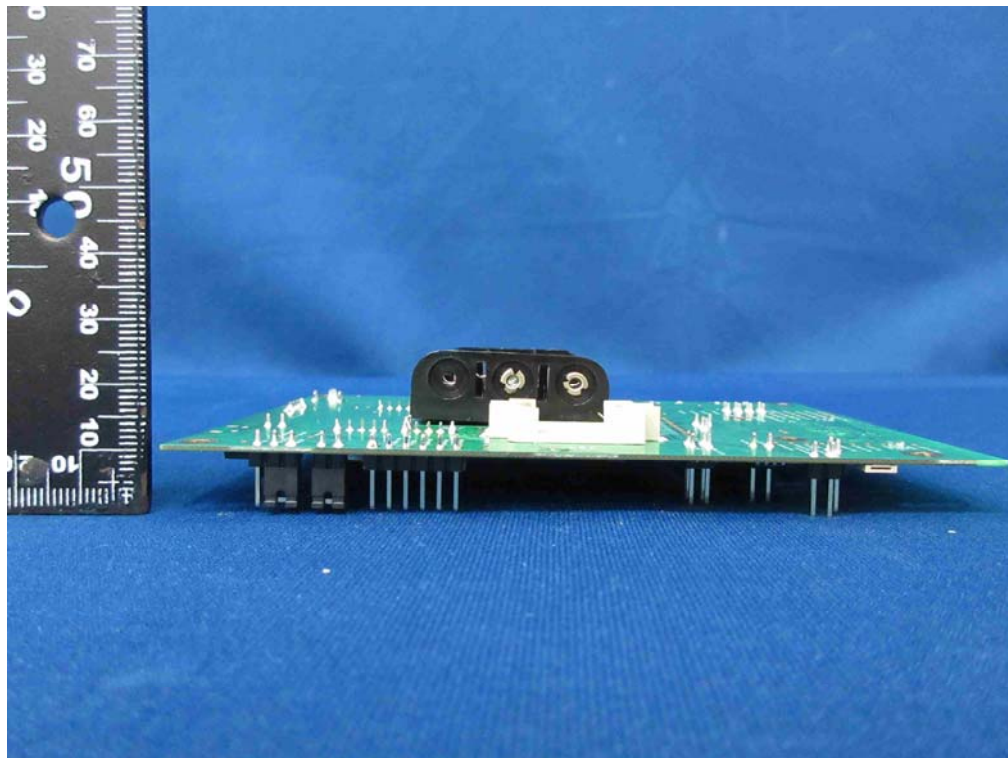
(25) EUT Photo (Internal Antenna PCB)



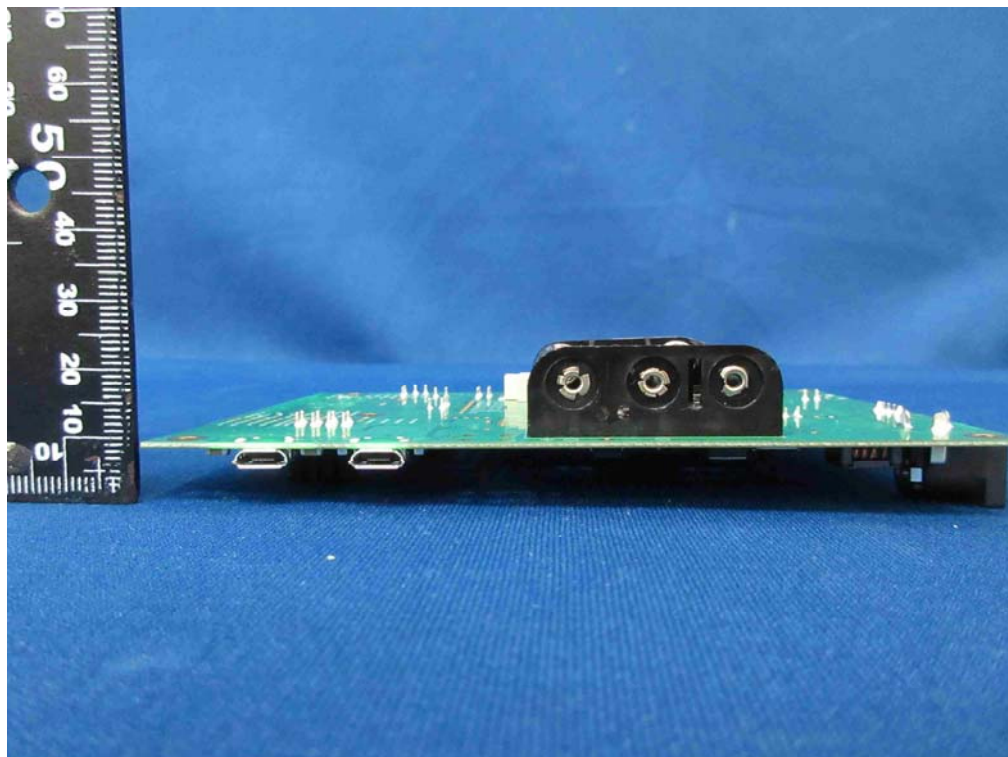
(26) EUT Photo



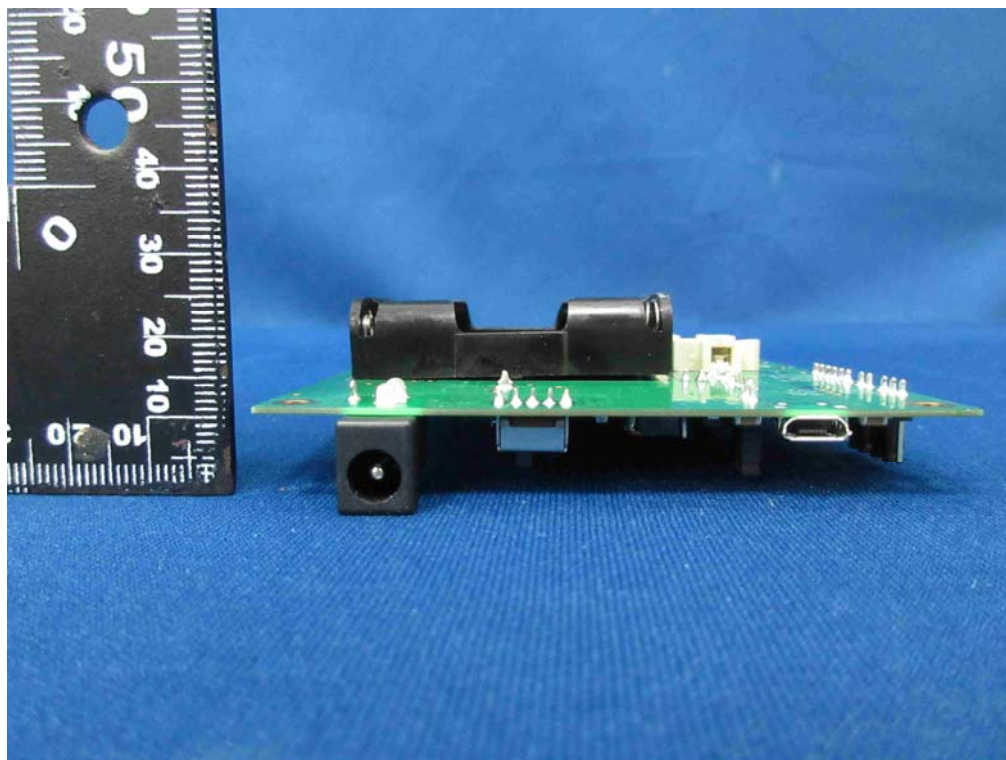
(27) EUT Photo



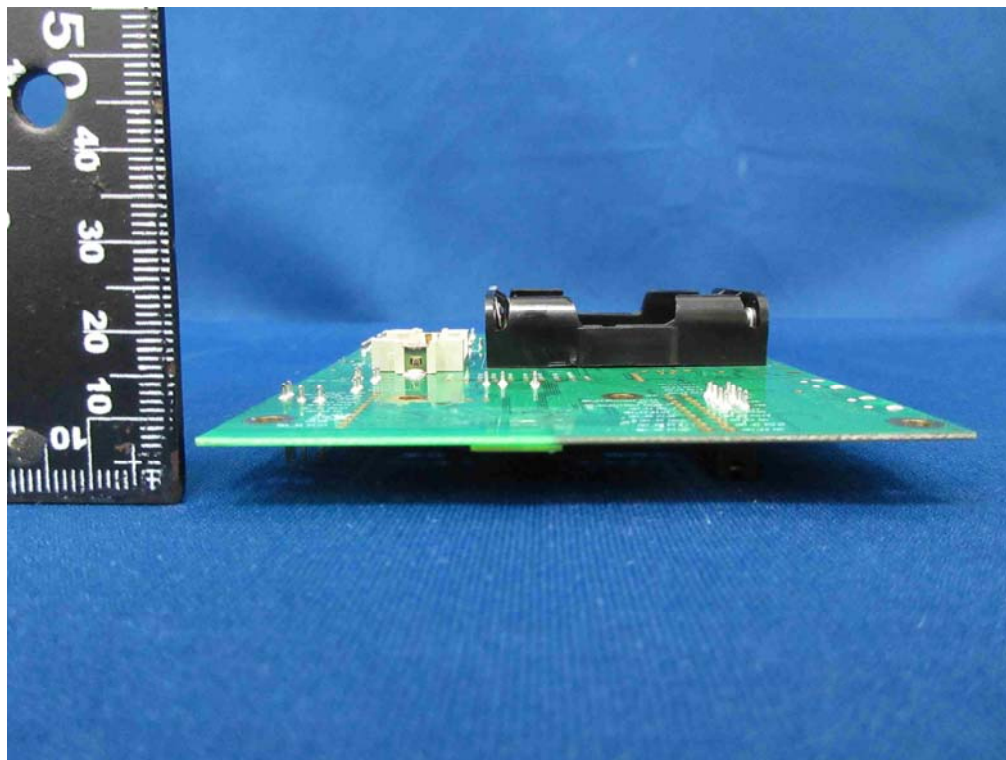
(28) EUT Photo



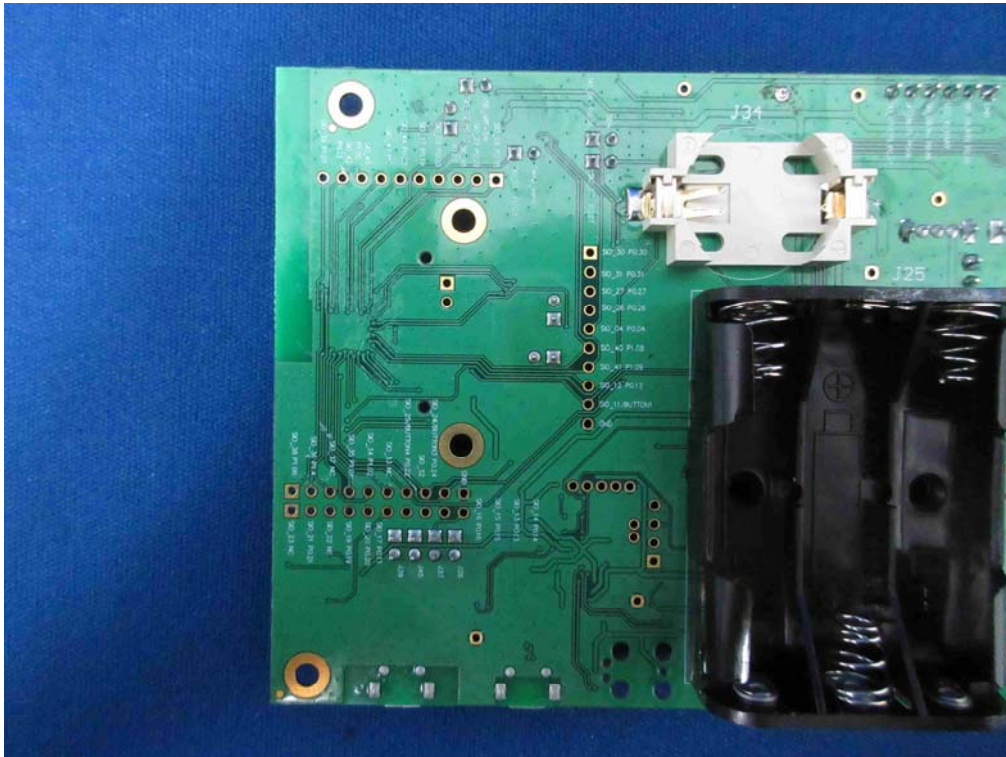
(29) EUT Photo



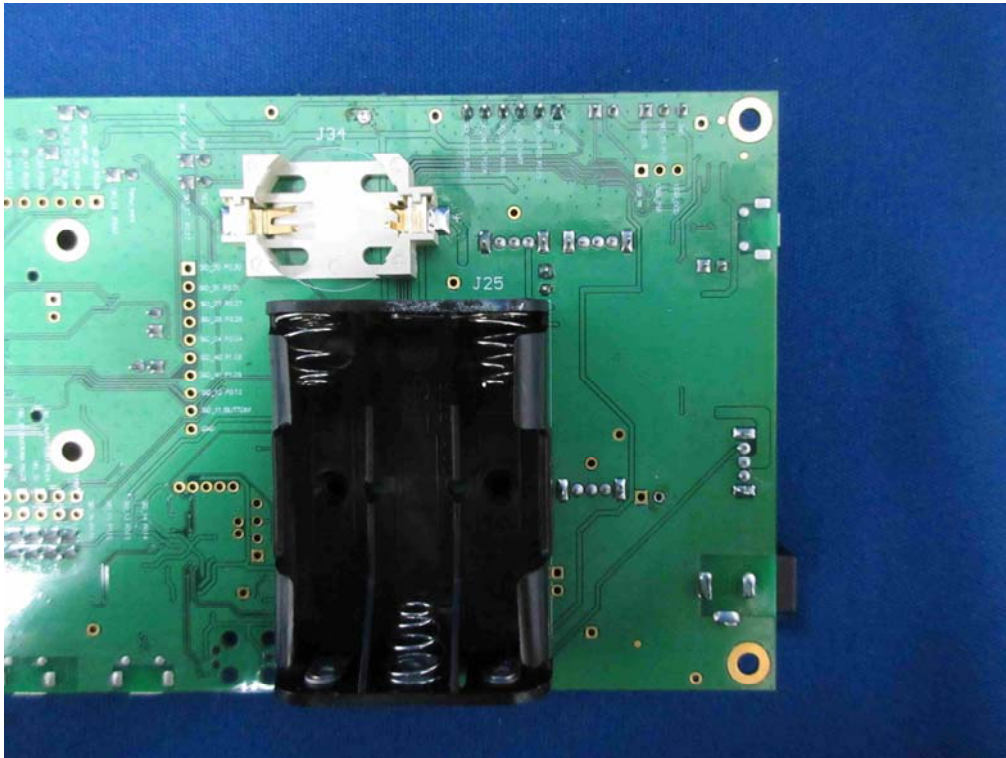
(30) EUT Photo



(31) EUT Photo



(32) EUT Photo



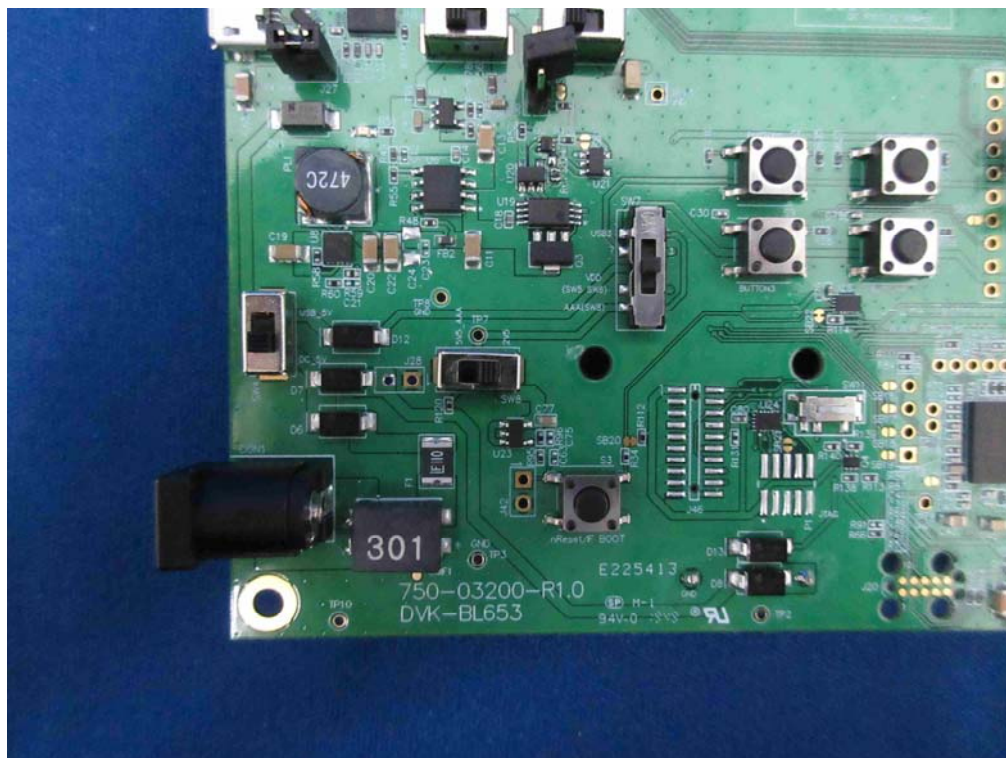
(33) EUT Photo



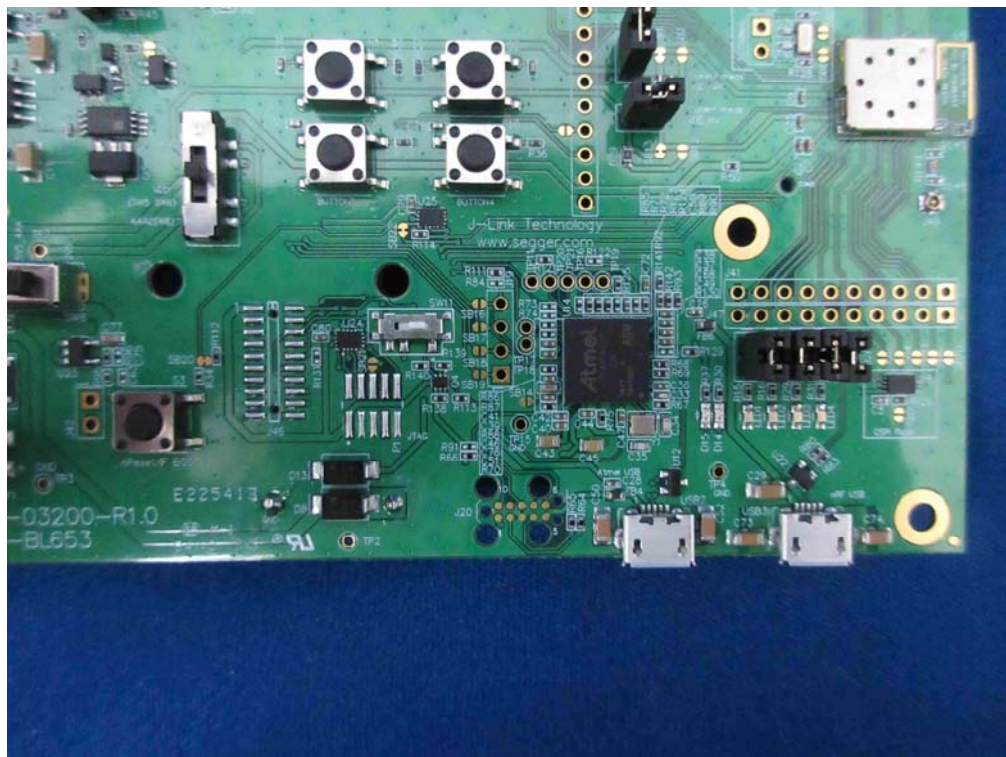
(34) EUT Photo



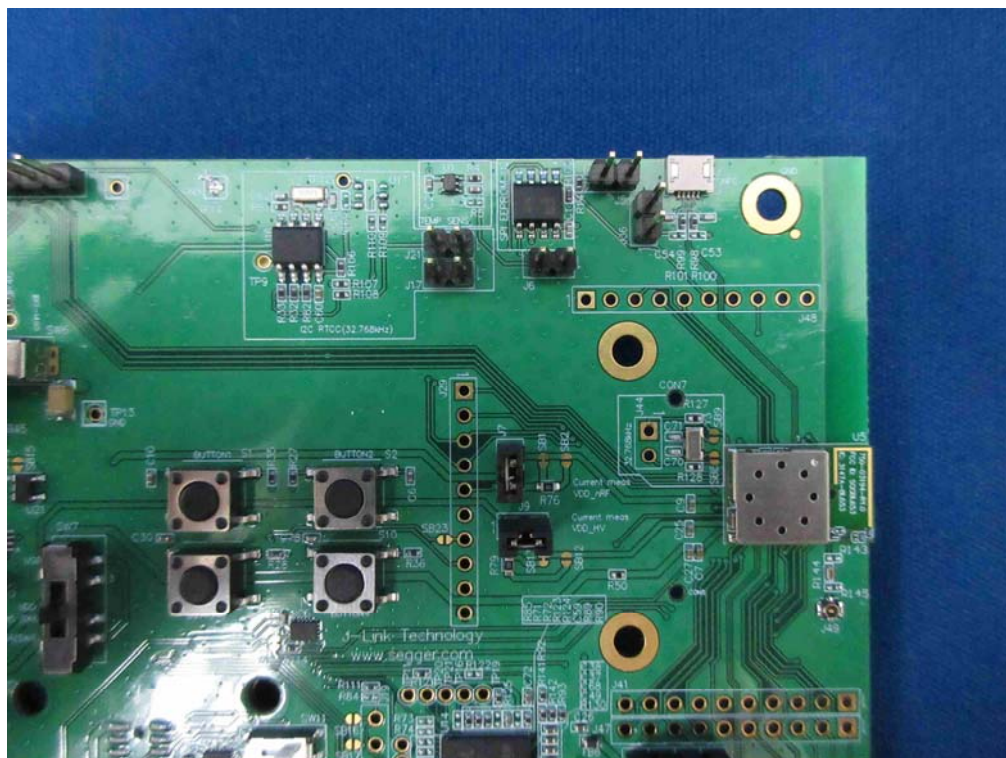
(35) EUT Photo



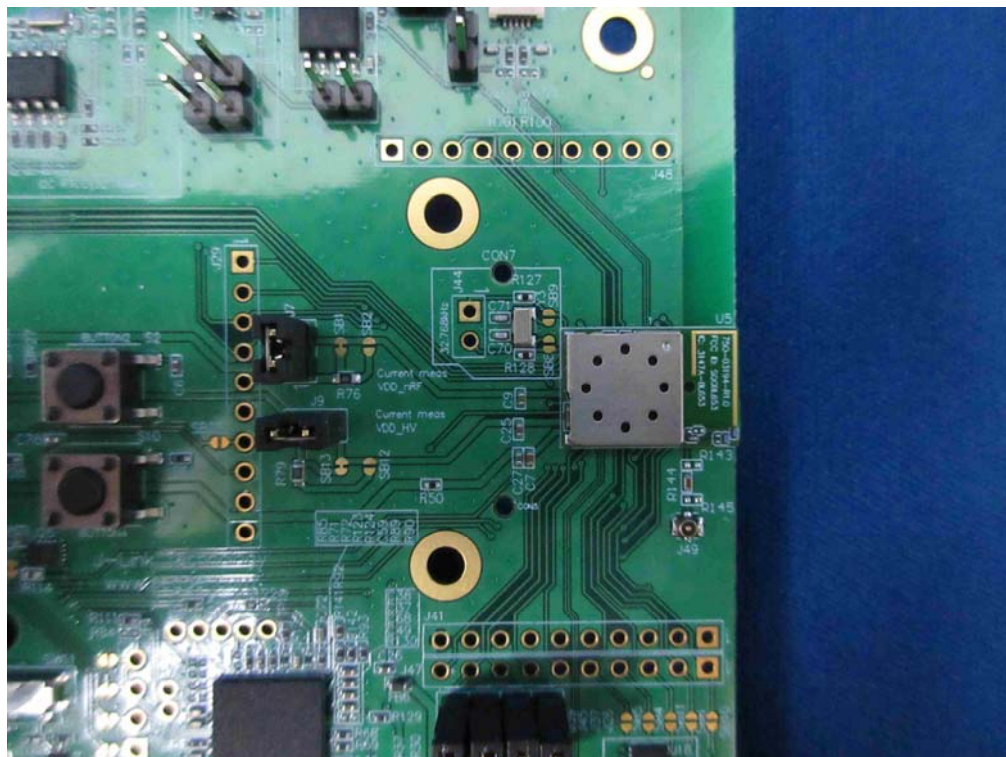
(36) EUT Photo



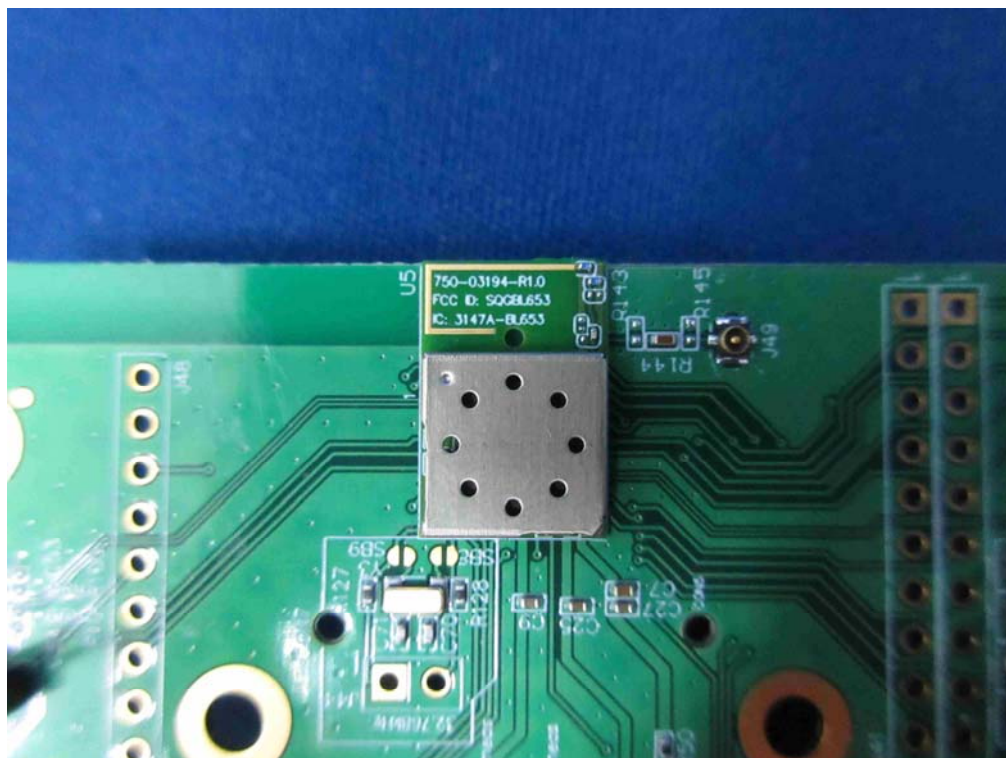
(37) EUT Photo



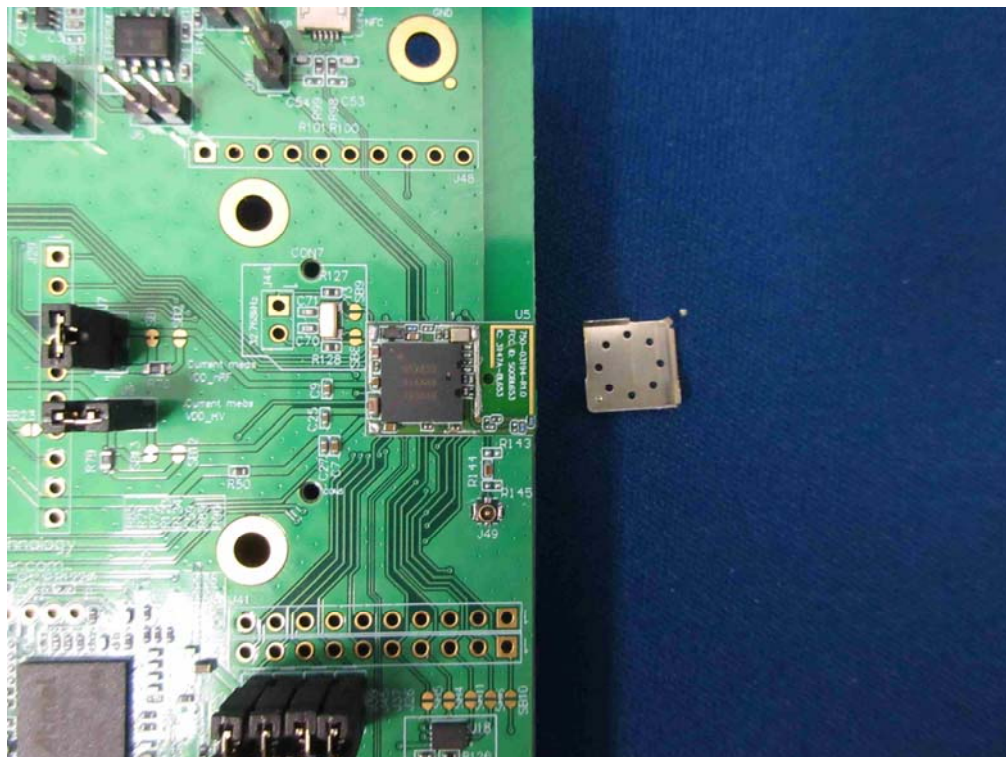
(38) EUT Photo



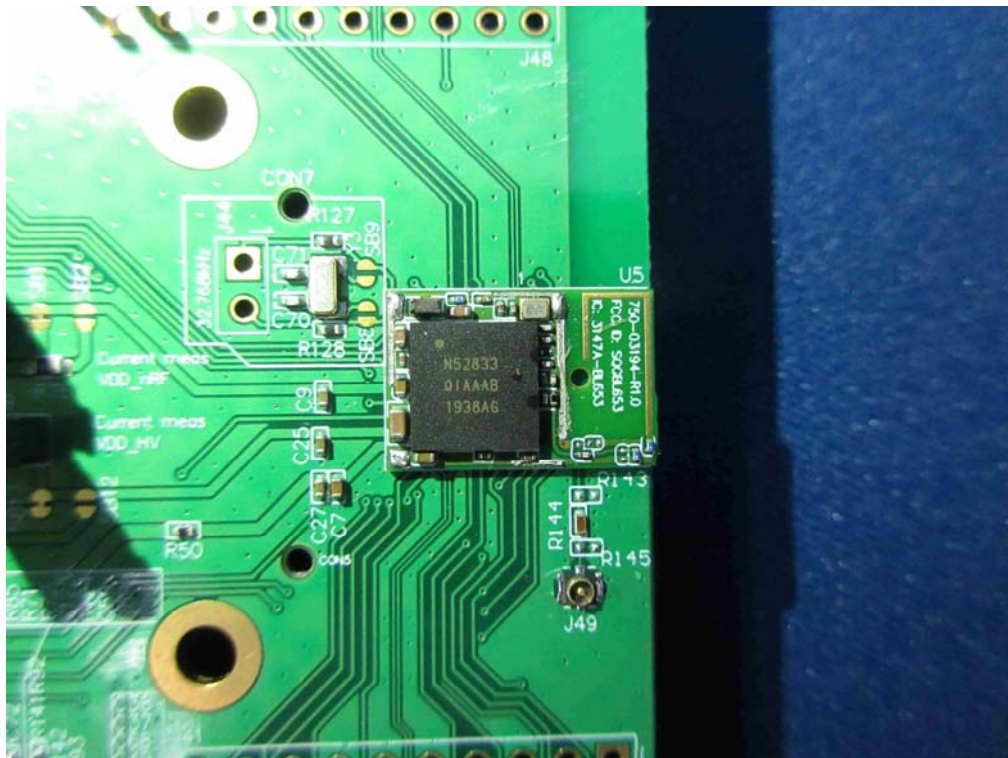
(39) EUT Photo



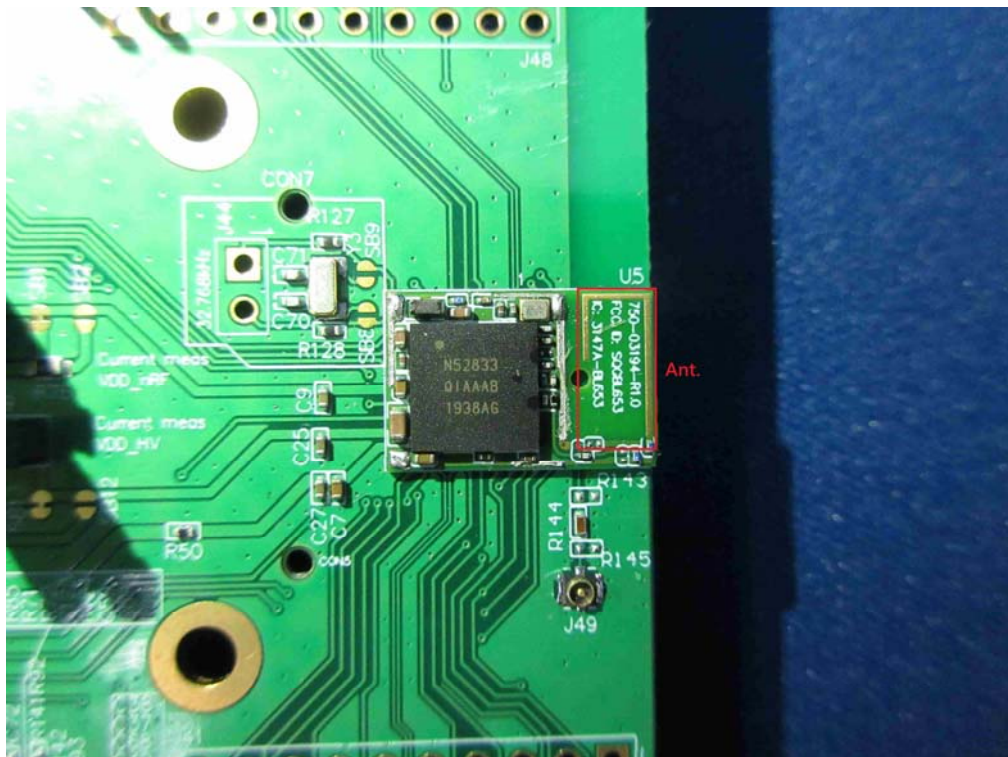
(40) EUT Photo



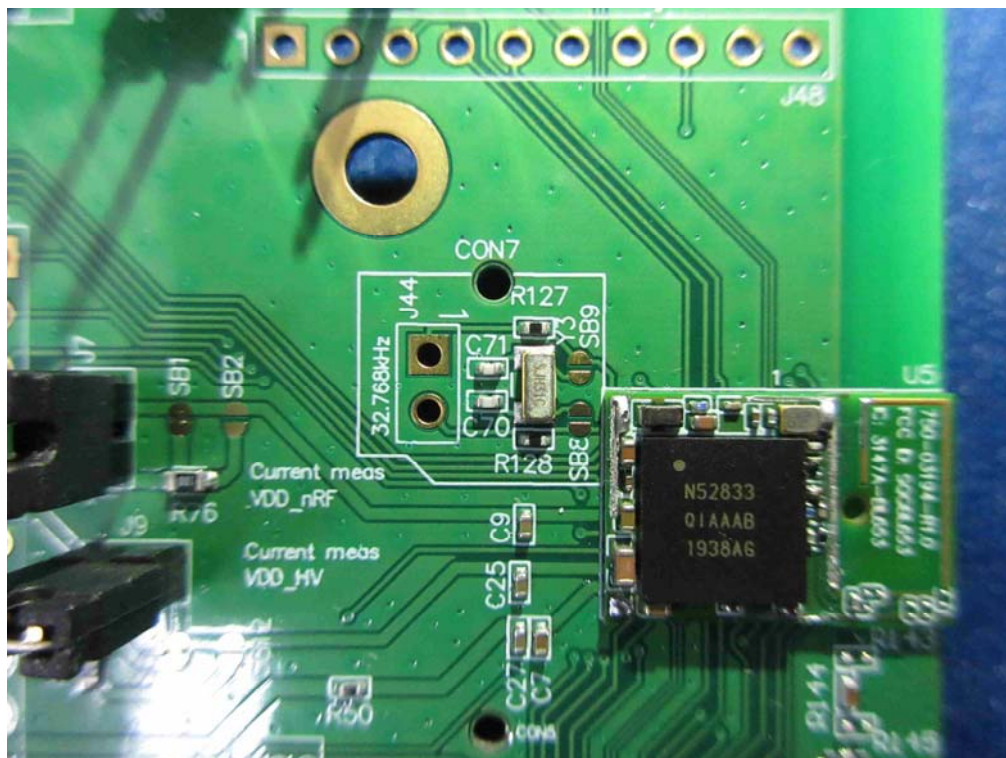
(41) EUT Photo



(42) EUT Photo (Antenna)(Laird, BL653_Printed PCB Antenna)



(43) EUT Photo



(44) EUT Photo

