FCC Part 15.247

TEST REPORT

For

CC&C Technologies, Inc.

8F, No.150, Jian Yi Rd, Zhonghe District, New Taipei City, 235, Taiwan

FCC ID: PANBT500

Report Type:	**Product Type:**
Original Report	BT5.0 Dongle

Report Producer:	Kaylee Chiang
Report Number:	RTWB171220002-00A
Report Date:	2018-02-26
Reviewed By:	Jerry Chang

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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Taiwan)

REVISION HISTORY

Revision	No.	Report Number	Issue Date	Description	Author/ Revised by
1.0	RTWB171220002	RTWB171220002-00A	2018.02.26	Original Report	Kaylee

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1 General Information

1.1 Product Description for Equipment Under Test (EUT)

Applicant:	CC&C Technologies, Inc. 8F, No.150, Jian Yi Rd, Zhonghe District, New Taipei City, 235, Taiwan
Manufacturer:	Kunshan CC&C Technologies, Co., LTD. No.9 Building, 3rd Main Street, Kunshan Free Trade Zone, JiangSu, China
Product:	BT5.0 Dongle
Model:	BT-500
Trade Name:	CC&C
Frequency Range:	2402-2480 MHz
Transmit Power:	BLE Mode (1M): 5.92dBm BLE Mode (2M): 5.94dBm
Modulation Technique:	BLE Mode: GFSK
Transmit Data Rate:	BLE Mode: 1 Mbps BLE Mode: 2 Mbps
Number of Channels:	BLE Mode: 40 Channels
Antenna Specification:	Chip Antenna/Gain: 0 dBi
Voltage Range:	5Vdc
Date of Test:	Feb. 01, 2018 ~ Feb. 26, 2018

**All measurement and test data in this report was gathered from production sample serial number: 171220002 (Assigned by BACL, Taiwan). The EUT supplied by the applicant was received on 2017-12-20.*

1.2 Objective

This report is prepared on behalf of *CC&C Technologies, Inc.* in accordance with Part 2, Subpart J, Part 15, Subparts A and C of the Federal Communication Commission's rules.

The objective is to determine compliance with FCC Part 15.247 rules for Output Power, Antenna Requirements, 6 dB Bandwidth, Power spectral density, 100 kHz Bandwidth of Band Edges Measurement, Conducted and Radiated Spurious Emissions.

1.3 Related Submittal(s)/Grant(s)

N/A

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

KDB 558074 D01 DTS Meas Guidance v04

1.5 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Taiwan) to collect test data is located on
☒70, Lane 169, Sec. 2, Datong Road, Xizhi Dist., New Taipei City 22183, Taiwan, R.O.C.
☒68-3, Lane 169, Sec. 2, Datong Road, Xizhi Dist., New Taipei City 22183, Taiwan, R.O.C.

Bay Area Compliance Laboratories Corp. (Taiwan) Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 3180) and the FCC designation No.TW3180 under the Mutual Recognition Agreement (MRA) in FCC Test. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.10.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 974454. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

2 System Test Configuration

2.1 Description of Test Configuration

For BLE mode, there are totally 40 channels.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2402	21	2442
2	2404	--	--
3	2406	--	--
4	2408	38	2476
--	--	39	2478
20	2440	40	2480

EUT was tested with Channel 1, 20 and 40.

2.2 Equipment Modifications

No modification was made to the EUT

2.3 EUT Exercise Software

Used "hypertrm.exe" software.

Test Software Version		Engineering Mode		
Test Frequency		Low	Mid	High
Power Level Setting	BLE Mode(1M)	0	0	0
	BLE Mode(2M)	0	0	0

2.4 Support Equipment List and Details

Description	Manufacturer	Model Number	BSMI	FCC ID / DOC	S/N
NB	DELL	E6410	N/A	PD98260NGU	10912240367

2.5 External Cable List and Details

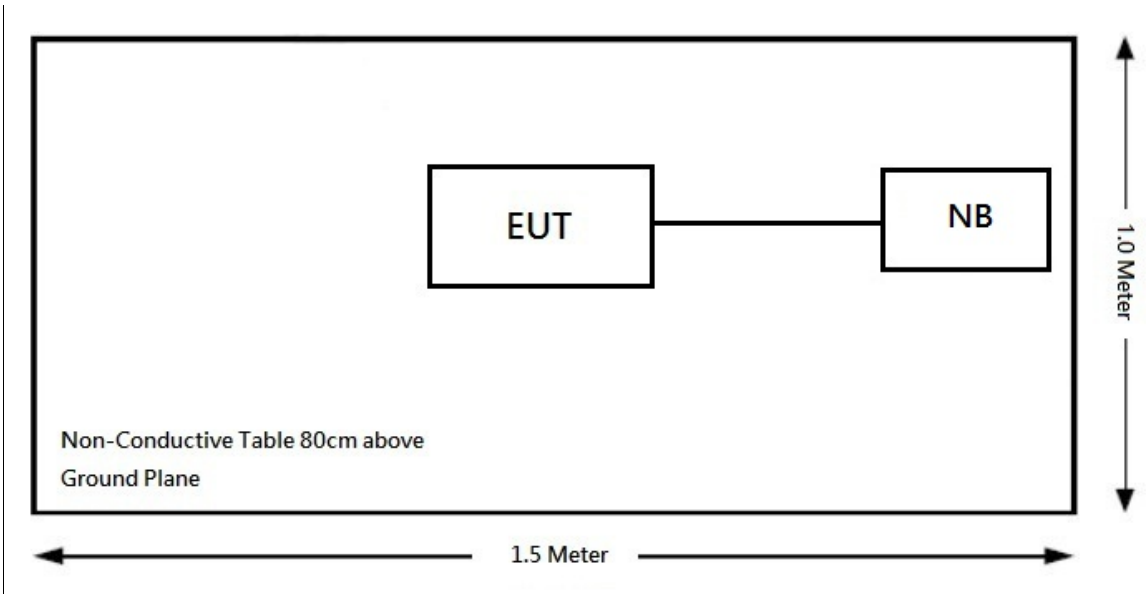
Cable Description	Length (m)	From	To
Mini USB Cable	1.5	NB	EUT

2.6 Block Diagram of Test Setup

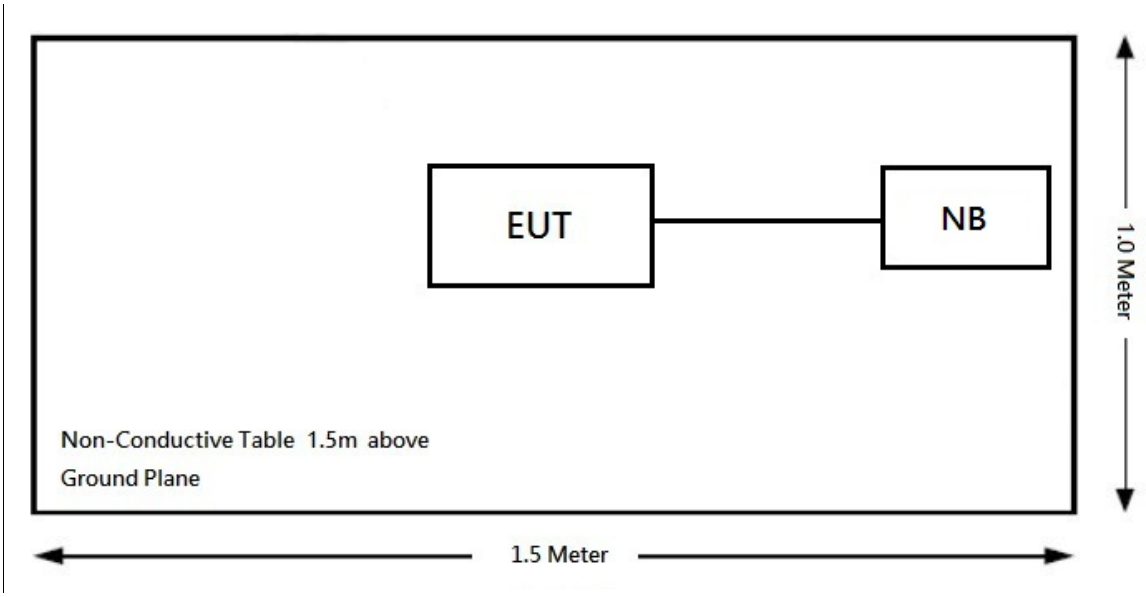
See test photographs attached in Exhibit A for the actual connections between EUT and support equipment.

Radiation

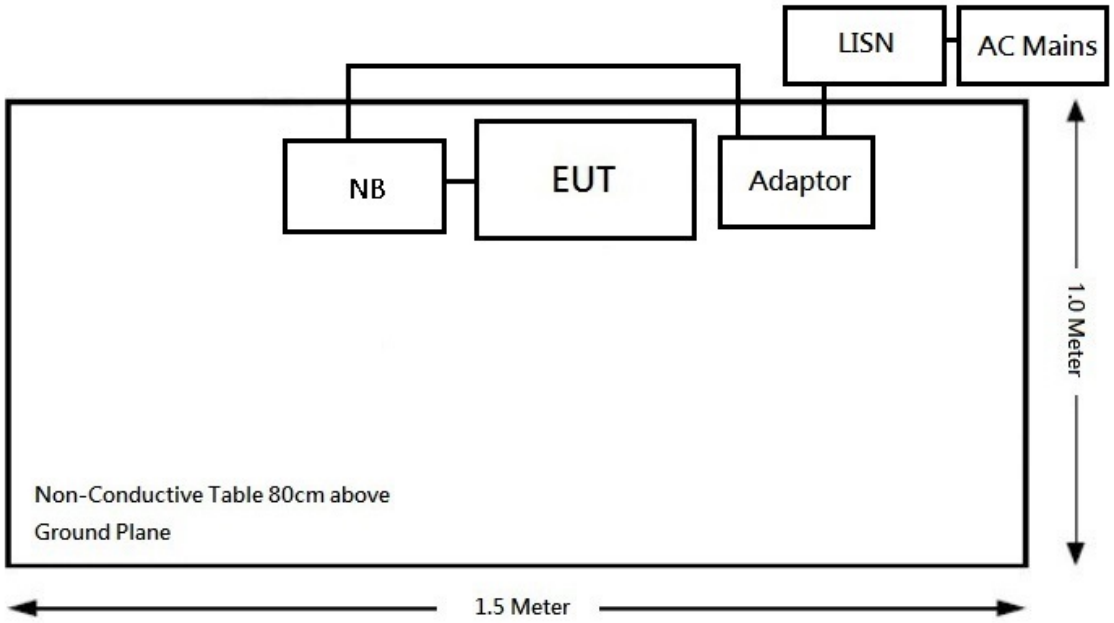
Below 1GHz:



Above 1GHz:



Conduction:


LISN
AC Mains
NB
EUT
Adaptor
1.0 Meter
Non-Conductive Table 80cm above
Ground Plane
1.5 Meter

2.7 Duty Cycle

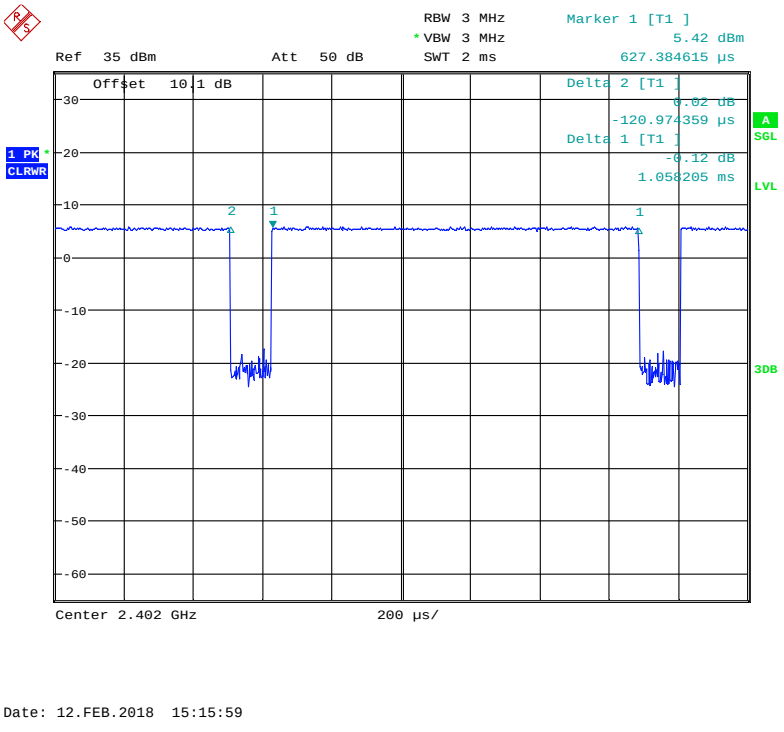
According to KDB 558074 D01 DTS Meas Guidance v04 section 6.0:
All measurements are to be performed with the EUT transmitting at 100% duty cycle at its maximum power control level; however, if 100% duty cycle cannot be achieved, measurements of duty cycle, x, and maximumpower transmission duration, T, are required for each tested mode of operation.

Radio Mode	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
BLE (1M)	1.058	1.178	89	0.51
BLE (2M)	1.055	1.179	89	0.51

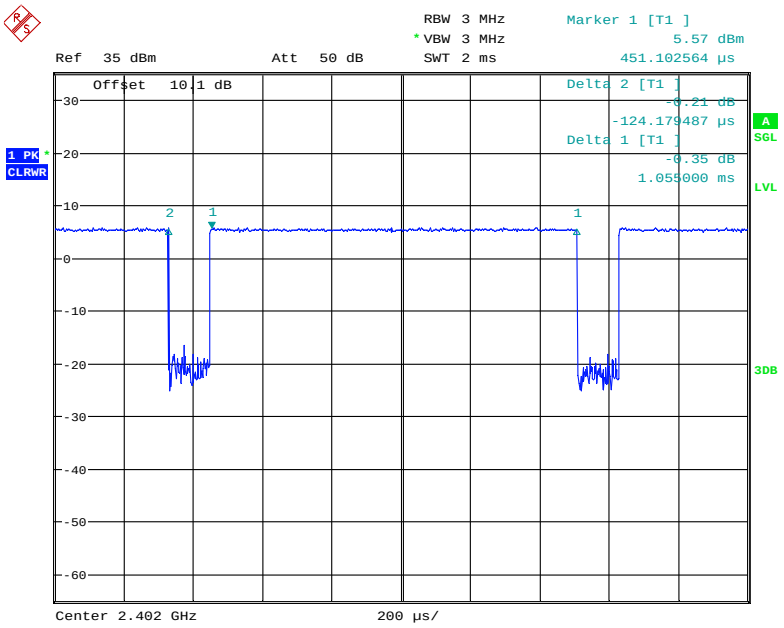
Note: Duty Cycle Correction Factor = 10*log(1/duty cycle)

Please refer to the following plots.

BLE Mode (1M)



BLE Mode (2M)



Date: 12.FEB.2018 15:17:41

3 Summary of Test Results

FCC Rules	Description of Test	Result
§15.247(i), §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance*
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247(a)(2)	6 dB Emission Bandwidth	Compliance*
§15.247(b)(3)	Maximum Peak Output Power	Compliance*
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance*
§15.247(e)	Power Spectral Density	Compliance*

Note:
Compliance*: Refer to RTWB171220001-00A Report with FCC ID: PANBM52840

4 FCC §15.247(i) & 2.1093 - RF Exposure

4.1 Applicable Standard

According to FCC §15.247(i)

Systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances
$\leqslant$ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] •
[$\surd$ f(GHz)] $\leqslant$ 3.0 for 1-g SAR and $\leqslant$ 7.5 for 10-g extremity SAR, where

1. f(GHz) is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

4.2 RF Exposure Evaluation Result

FCC

Worse case:

SAR evaluation:

Mode	Frequency (MHz)	Tunp-up Power		Evaluation Distrance (mm)	SAR Excluion Result	Extremity SAR Exclusion Limit
		(dBm)	(mW)			(1g SAR)
BLE	2480	6.0	3.981	5	1.3	3

Result: SAR test is exempted.

5 FCC §15.207 - AC Line Conducted Emissions

5.1 Applicable Standard

FCC §15.207

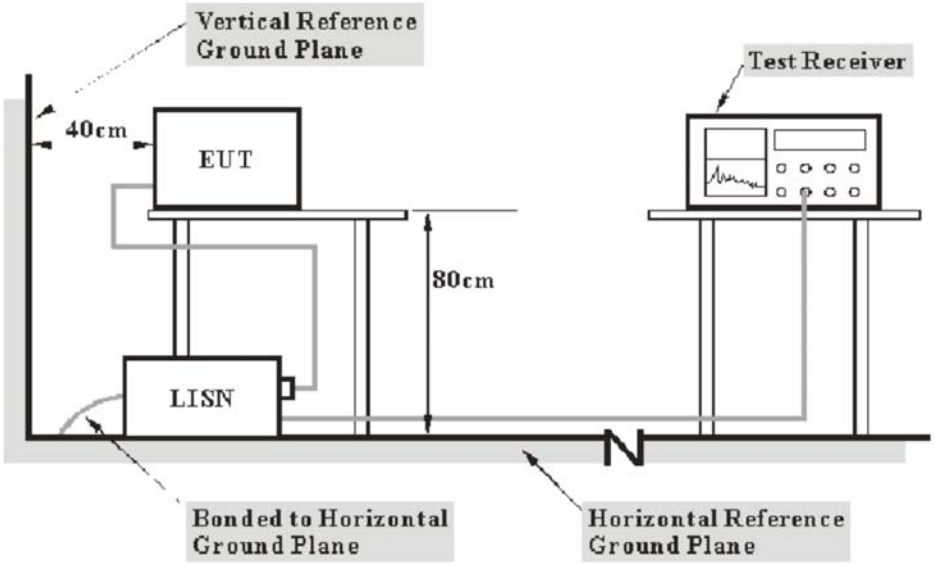
5.2 Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between LISN/ISN and receiver, LISN/ISN voltage division factor, LISN/ISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Taiwan) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report

Port	Expanded Measurement uncertainty
AC Mains	4.64 dB (k=2, 95% level of confidence)

5.3 EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

5.4 EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz. During the conducted emission test, the EMI test receiver was set with the following configurations

Frequency Range	Receiver RBW
150 kHz - 30 MHz	9 kHz

5.5 Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN. Maximizing procedure was performed on the six (6) highest emissions of the EUT. All data was recorded in the Quasi-peak and average detection mode.

5.6 Corrected Factor & Margin Calculation

The factor is calculated by adding LISN/ISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation

The "Over Limit" column of the following data tables indicates the degree of compliance with the applicable limit. For example, an over limit of -7 dB means the emission is 7 dB below the limit. The equation for Over Limit calculation is as follows:

Over Limit = Level – Limit Line

5.7 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Date	Calibration Due Date
LISN	Rohde & Schwarz	ENV216	101248	2017/07/20	2018/07/19
EMI Test Receiver	Rohde & Schwarz	ESR7	101419	2017/11/06	2018/11/05
Pulse Limiter	Rohde & Schwarz	ESH3Z2	TXZEM025	2017/08/10	2018/08/09
RF Cable	EMEC	EM-CB5D	001	2017/07/10	2018/07/09
Software	AUDIX	E3	V9.150826k	N.C.R	N.C.R

**** Statement of Traceability:*** BACL Corp. attests that all calibrations have been performed according to TAF requirements, traceable to the ETC.

5.8 Test Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	58 %
ATM Pressure:	1010 hPa

The testing was performed by Tom Hsu on 2018-02-01.

5.9 Test Results

Please refer to the following plots and tables.

Test mode: Transmitting

Main: AC 120V/60 Hz, Line

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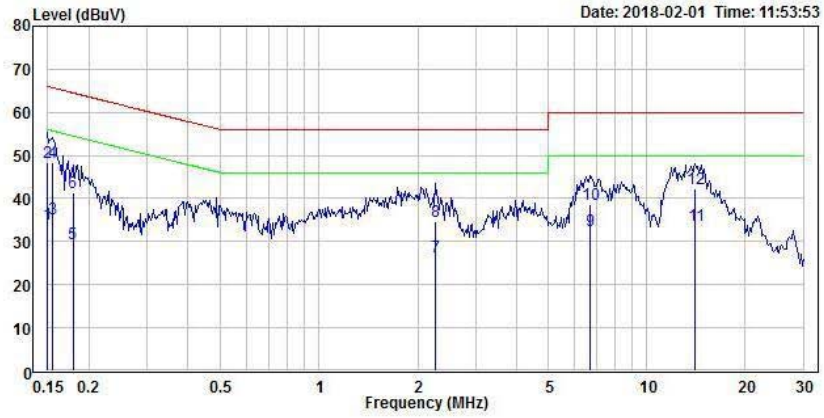
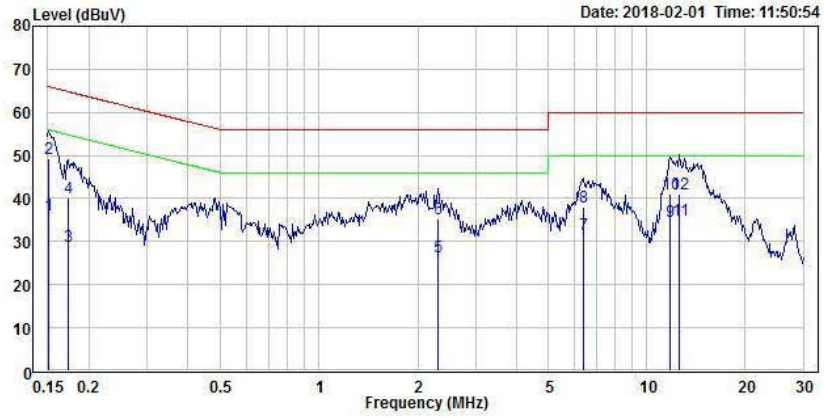


Condition: Line
EUT :
Model :
Note :
Power : 110V/60Hz

	Freq	Level	Limit Line	Over Limit	Factor	Read Level	Remark	Pol/Phase
	MHz	dBuV	dBuV	dB	dB	dBuV		
1	0.150	33.97	56.00	-22.03	19.50	14.47	Average	Line
2	0.150	48.23	66.00	-17.77	19.50	28.73	QP	Line
3	0.155	35.37	55.74	-20.37	19.50	15.87	Average	Line
4	0.155	48.46	65.74	-17.28	19.50	28.96	QP	Line
5	0.179	29.44	54.54	-25.10	19.50	9.94	Average	Line
6	0.179	41.44	64.54	-23.10	19.50	21.94	QP	Line
7	2.270	26.36	46.00	-19.64	19.59	6.77	Average	Line
8	2.270	34.66	56.00	-21.34	19.59	15.07	QP	Line
9	6.708	32.59	50.00	-17.41	19.70	12.89	Average	Line
10	6.708	38.77	60.00	-21.23	19.70	19.07	QP	Line
11	14.074	33.79	50.00	-16.21	19.80	13.99	Average	Line
12	14.074	42.39	60.00	-17.61	19.80	22.59	QP	Line

Main: AC 120V/60 Hz, Neutral

倍科檢驗科技有限公司 Bay Area Compliance Labs Corp.



Condition: Neutral
EUT :
Model :
Note :
Power : 110V/60Hz

	Freq	Level	Limit Line	Over Limit	Factor	Read Level	Remark	Pol/Phase
	MHz	dBuV	dBuV	dB	dB	dBuV		
1	0.151	36.32	55.93	-19.61	19.63	16.69	Average	Neutral
2	0.151	49.14	65.93	-16.79	19.63	29.51	QP	Neutral
3	0.173	28.88	54.81	-25.93	19.63	9.25	Average	Neutral
4	0.173	40.01	64.81	-24.80	19.63	20.38	QP	Neutral
5	2.306	26.40	46.00	-19.60	19.73	6.67	Average	Neutral
6	2.306	35.20	56.00	-20.80	19.73	15.47	QP	Neutral
7	6.395	31.76	50.00	-18.24	19.85	11.91	Average	Neutral
8	6.395	38.17	60.00	-21.83	19.85	18.32	QP	Neutral
9	11.811	34.67	50.00	-15.33	19.93	14.74	Average	Neutral
10	11.811	41.17	60.00	-18.83	19.93	21.24	QP	Neutral
11	12.588	34.97	50.00	-15.03	19.95	15.02	Average	Neutral
12	12.588	41.20	60.00	-18.80	19.95	21.25	QP	Neutral

6 FCC §15.209, §15.205, §15.247(d) – Spurious Emissions

6.1 Applicable Standard

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz.

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110 0.495 – 0.505 2.1735 – 2.1905 4.125 – 4.128 4.17725 – 4.17775 4.20725 – 4.20775 6.215 – 6.218 6.26775 – 6.26825 6.31175 – 6.31225 8.291 – 8.294 8.362 – 8.366 8.37625 – 8.38675 8.41425 – 8.41475 12.29 – 12.293 12.51975 – 12.52025 12.57675 – 12.57725 13.36 – 13.41	16.42 – 16.423 16.69475 – 16.69525 25.5 – 25.67 37.5 – 38.25 73 – 74.6 74.8 – 75.2 108 – 121.94 123 – 138 149.9 – 150.05 156.52475 – 156.52525 156.7 – 156.9 162.0125 –167.17 167.72 – 173.2 240 – 285 322 – 335.4 399.9 – 410 608 – 614	960 – 1240 1300 – 1427 1435 – 1626.5 1645.5 – 1646.5 1660 – 1710 1718.8 – 1722.2 2200 – 2300 2310 – 2390 2483.5 – 2500 2690 – 2900 3260 – 3267 3.332 – 3.339 3 3458 – 3 358 3.600 – 4.400	4. 5 – 5. 15 5. 35 – 5. 46 7.25 – 7.75 8.025 – 8.5 9.0 – 9.2 9.3 – 9.5 10.6 – 12.7 13.25 – 13.4 14.47 – 14.5 15.35 – 16.2 17.7 – 21.4 22.01 – 23.12 23.6 – 24.0 31.2 – 31.8 36.43 – 36.5 Above 38.6

As per FCC §15.209(a): Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As per FCC §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

6.2 Measurement Uncertainty

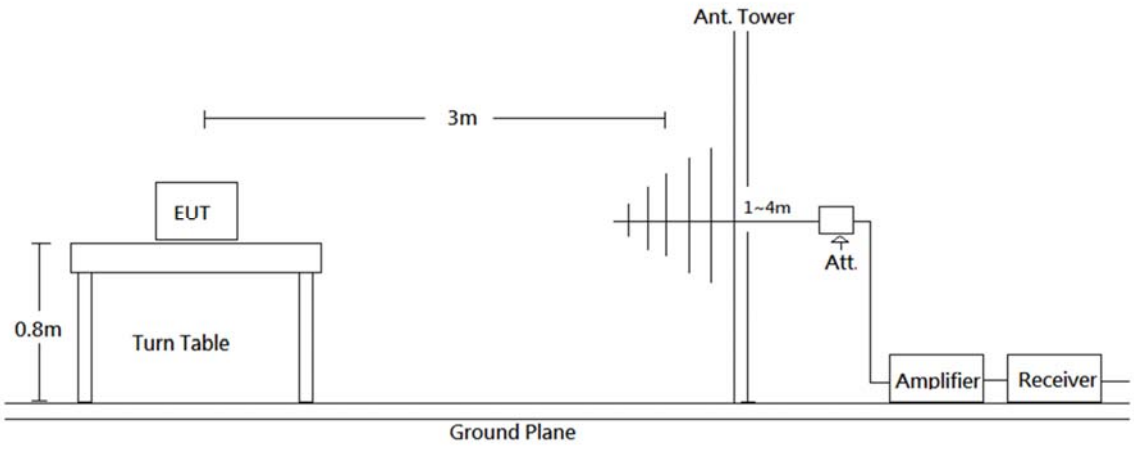
All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Taiwan) is shown in below table. And the uncertainty will not be taken into consideration for the test data recorded in the report.

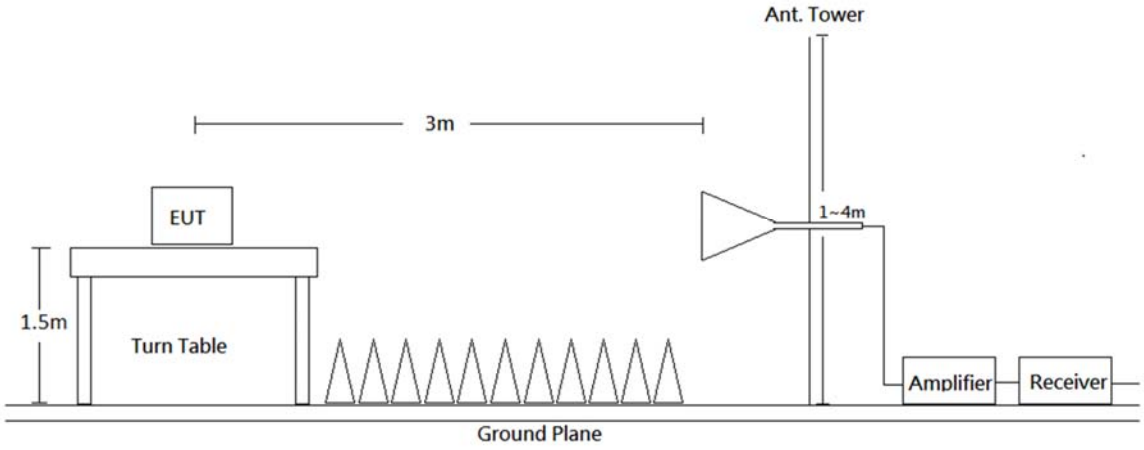
Frequency	Measurement uncertainty
30 MHz~200 MHz	3.76 dB (k=2, 95% level of confidence)
200 MHz~1 GHz	4.12 dB (k=2, 95% level of confidence)
1 GHz~6 GHz	4.84 dB (k=2, 95% level of confidence)
6 GHz~18 GHz	5.16 dB (k=2, 95% level of confidence)
18 GHz~26 GHz	4.84 dB (k=2, 95% level of confidence)
26 GHz~40 GHz	4.30 dB (k=2, 95% level of confidence)

6.3 EUT Setup

Blow 1 GHz:



Above 1 GHz:



Radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC Part 15.209 and FCC 15.247 Limits.

6.4 EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 26.5 GHz. During the radiated emission test, the EMI test receiver for below 1GHz and spectrum analyzer for above 1GHz was set with the following configurations measurement method 6.3 in ANSI C63.10.

Frequency Range	RBW	VBW	Detector	Duty cycle	Measurement method
30-1000 MHz	120 kHz	/	QP		QP
Above 1 GHz	1 MHz	3 MHz	PK		PK
	1 MHz	3 MHz	RMS	>98%	Ave
	1 MHz	1/T	PK	<98%	Ave

6.5 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detector mode from 30 MHz to 1 GHz and PK and average detector modes for frequencies above 1 GHz.

6.6 Corrected Factor & Margin Calculation

The Correct Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Result –Limit

6.7 Test Results Summary

According to the data in the following table, the EUT complied with the FCC §15.209 Limit. Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$Lm + U(Lm) \leq Llim + Ucispr$$

In BACL, U(Lm) is less than Ucispr, if Lm is less than Llim, it implies that the EUT complies with the limit.

6.8 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
966A Room					
Bilog Antenna	Sunol & Mini-Circuits	JB6/UNAT-6+	A050115/15542_01	2017/12/20	2018/12/19
Horn Antenna	EMCO	3115	9311-4158	2017/05/24	2018/05/23
Horn Antenna	ETS-Lindgren	3116	62638	2017/09/13	2018/09/12
Preamplifier	Sonoma	310N	130602	2017/07/03	2018/07/02
Preamplifier	EMEC	EM01G18G	60697	2017/04/14	2018/04/13
Preamplifier	EMEC	EM18G40G	060656	2018/01/15	2019/01/14
EMI Test Receiver	Rohde & Schwarz	ESR7	101419	2017/11/06	2018/11/05
Spectrum Analyzer	Rohde & Schwarz	FSV40	101203	2017/07/13	2018/07/12
Microflex Cable	UTIFLEX	UFB311A-Q-1440-300300	220490-006	2017/10/31	2018/10/30
Microflex Cable	UTIFLEX	UFA210A-1-3149-300300	MFR64639 226389-001	2017/11/10	2018/11/09
Microflex Cable	ROSNOL	K1K50-UP0264-K1K50-450CM	160309-1	2017/03/14	2018/03/13
Microflex Cable	ROSNOL	K1K50-UP0264-K1K50-80CM	160309-2	2018/01/17	2019/01/16
Turn Table	Champro	TT-2000	060772-T	N.C.R	N.C.R
Antenna Tower	Champro	AM-BS-4500-B	060772-A	N.C.R	N.C.R
Controller	Champro	EM1000	60772	N.C.R	N.C.R
Software	Farad	EZ_EMC	BACL-03A1	N.C.R	N.C.R

***Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Taiwan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

6.9 Test Environmental Conditions

Temperature:	25° C
Relative Humidity:	58 %
ATM Pressure:	1010 hPa

The testing was performed by Tom Hsu on 2018-02-12.

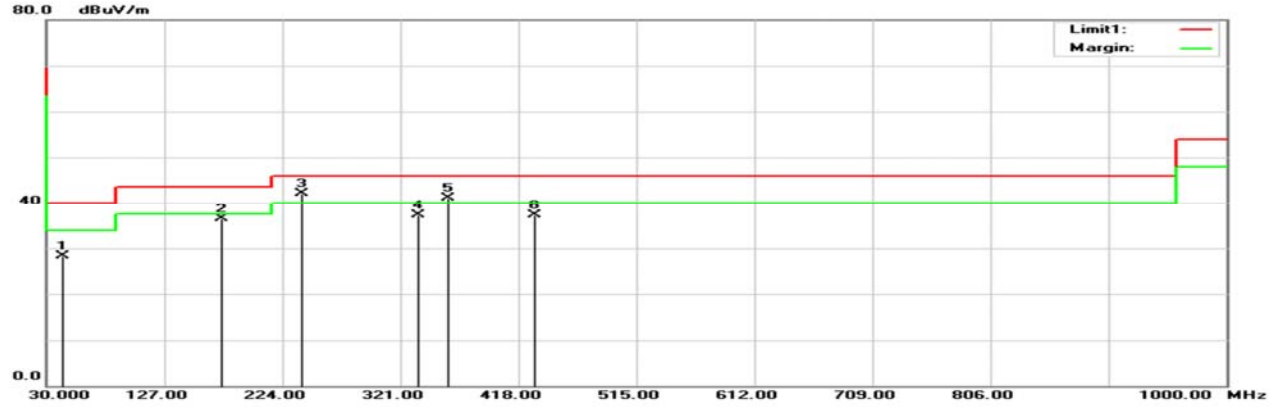
6.10 Test Results

Test Mode: Transmitting

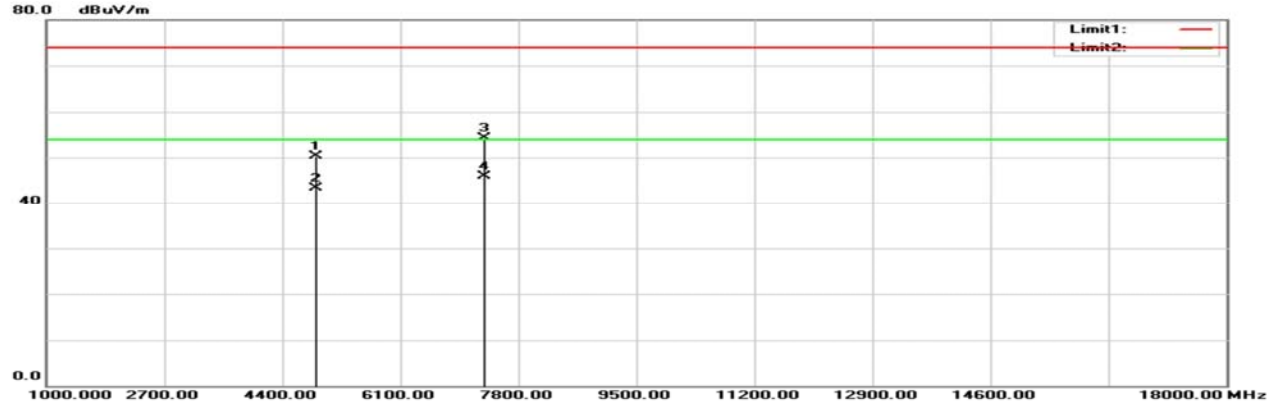
BLE Mode (1M)

Horizontal (*worst case is BLE mode middle channel*)

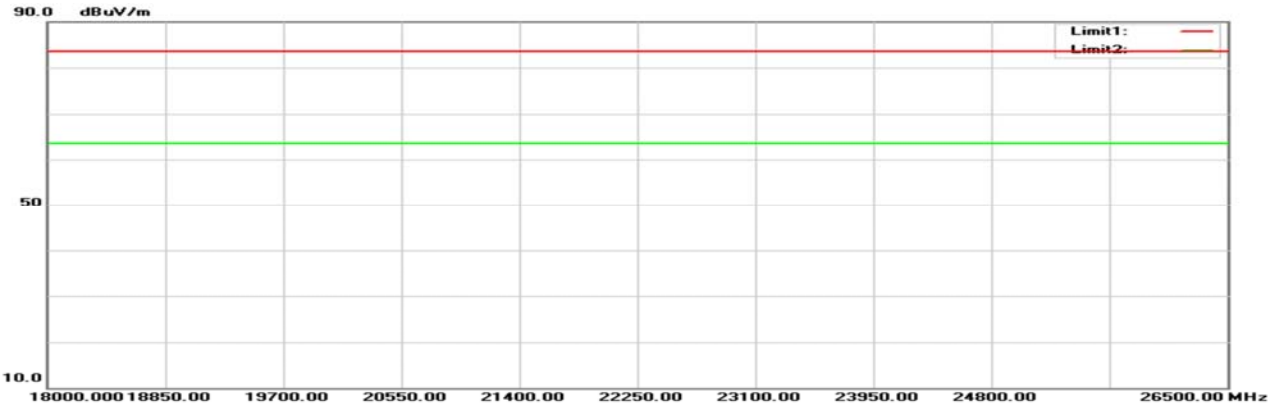
30MHz-1GHz:



1GHz-18GHz:

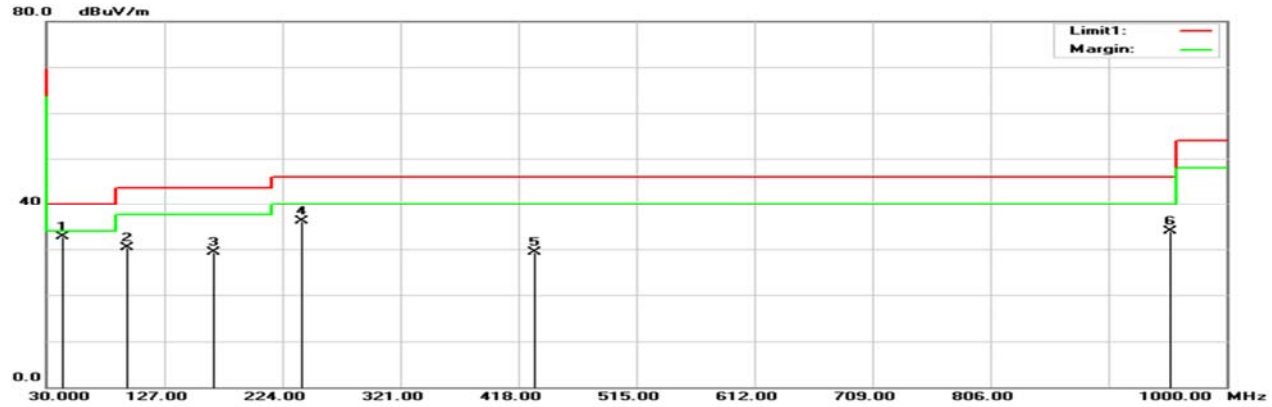


18GHz-26.5GHz:

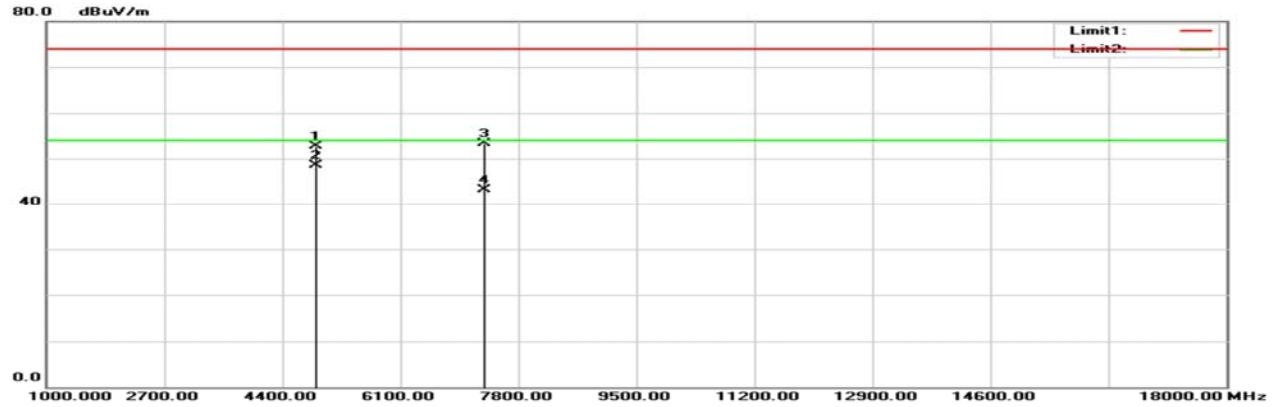


Vertical (*worst case is BLE mode middle channel*)

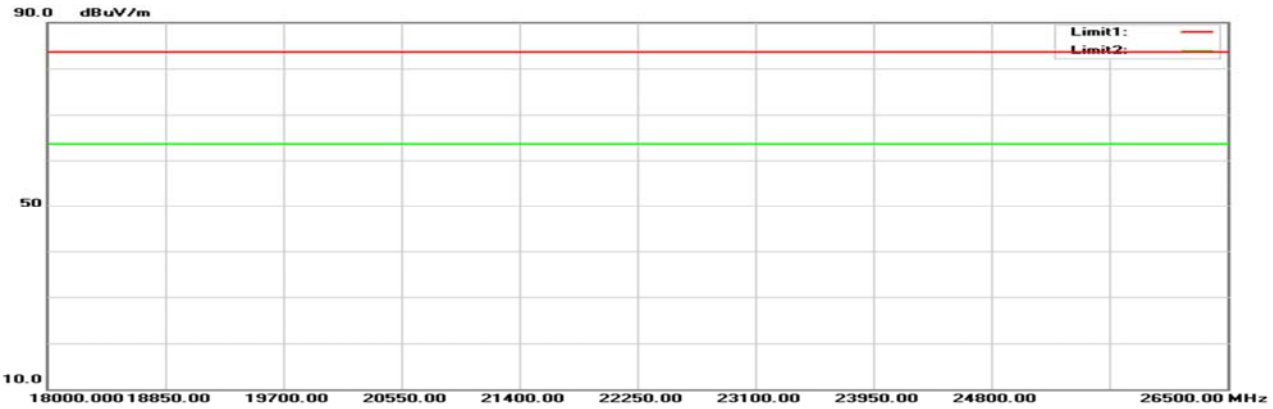
30MHz-1GHz:



1GHz-18GHz:



18GHz-26.5GHz:



Horizontal

Frequency (MHz)	Reading (dB μV)	Correct Factor(dB/m)	Result (dB μV/m)	Limit (dB μV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
BLE Low Channel								
43.5800	41.44	-13.04	28.40	40.00	-11.60	100	284	QP
96.9300	47.40	-15.21	32.19	43.50	-11.31	100	276	QP
239.5200	53.43	-12.05	41.38	46.00	-4.62	100	289	QP
359.8000	47.20	-8.41	38.79	46.00	-7.21	100	196	QP
431.5800	44.91	-6.95	37.96	46.00	-8.04	100	50	QP
931.1300	30.24	1.94	32.18	46.00	-13.82	100	22	QP
2390.000	64.17	-4.89	59.28	74.00	-14.72	100	162	peak
2390.000	49.82	-4.89	44.93	54.00	-9.07	100	162	AVG
2402.000	97.15	-4.86	92.29	N/A	N/A	100	202	peak
2402.000	96.47	-4.86	91.61	N/A	N/A	100	202	AVG
4804.000	49.86	0.98	50.84	74.00	-23.16	195	142	peak
4804.000	44.29	0.98	45.27	54.00	-8.73	195	142	AVG
7206.000	49.03	6.56	55.59	74.00	-18.41	203	73	peak
7206.000	41.38	6.56	47.94	54.00	-6.06	203	73	AVG
BLE Mid Channel								
43.5800	41.32	-13.04	28.28	40.00	-11.72	100	280	QP
173.5600	49.04	-12.48	36.56	43.50	-6.94	100	208	QP
239.5200	54.16	-12.05	42.11	46.00	-3.89	100	294	QP
335.5500	46.33	-8.96	37.37	46.00	-8.63	100	205	QP
359.8000	49.52	-8.41	41.11	46.00	-4.89	100	205	QP
431.5800	44.18	-6.95	37.23	46.00	-8.77	100	32	QP
2440.000	97.27	-4.78	92.49	N/A	N/A	112	208	peak
2440.000	96.62	-4.78	91.84	N/A	N/A	112	208	AVG
4880.000	49.07	1.24	50.31	74.00	-23.69	195	133	peak
4880.000	42.11	1.24	43.35	54.00	-10.65	195	133	AVG
7320.000	47.21	7.01	54.22	74.00	-19.78	100	278	peak
7320.000	38.95	7.01	45.96	54.00	-8.04	100	278	AVG
BLE High Channel								
94.0200	48.19	-15.81	32.38	43.50	-11.12	100	289	QP
173.5600	49.99	-12.48	37.51	43.50	-5.99	100	225	QP
239.5200	53.65	-12.05	41.60	46.00	-4.40	100	290	QP
359.8000	47.69	-8.41	39.28	46.00	-6.72	100	205	QP
431.5800	44.26	-6.95	37.31	46.00	-8.69	100	27	QP
720.6400	31.61	-2.48	29.13	46.00	-16.87	100	198	QP
2480.000	96.45	-4.68	91.77	N/A	N/A	115	206	peak
2480.000	95.61	-4.68	90.93	N/A	N/A	115	206	AVG
2483.500	64.52	-4.69	59.83	74.00	-14.17	100	251	peak
2483.500	49.98	-4.69	45.29	54.00	-8.71	100	251	AVG
4960.000	46.52	1.51	48.03	74.00	-25.97	115	145	peak
4960.000	37.12	1.51	38.63	54.00	-15.37	115	145	AVG
7440.000	49.23	7.49	56.72	74.00	-17.28	100	301	peak
7440.000	41.36	7.49	48.85	54.00	-5.15	100	301	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported

Vertical

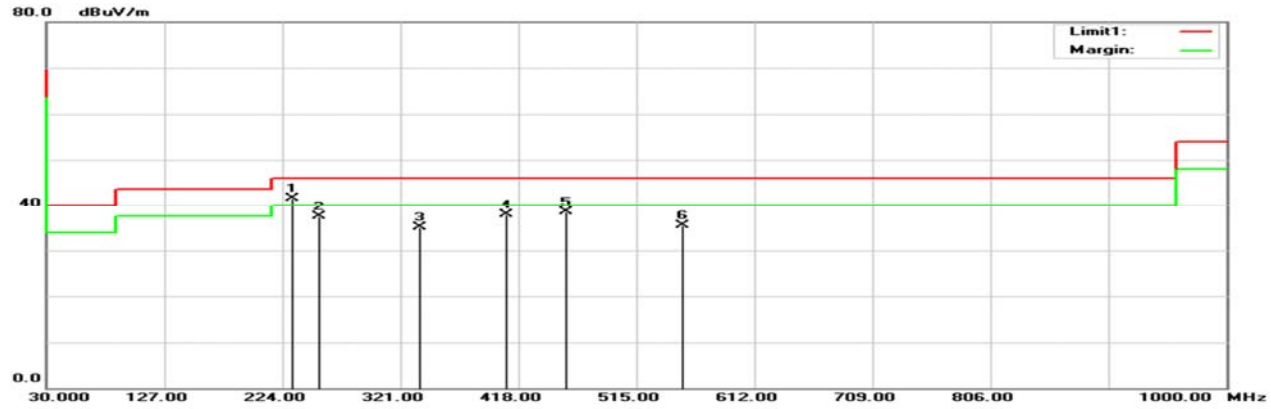
Frequency (MHz)	Reading (dBμV)	Correct Factor(dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
BLE Low Channel								
43.5800	46.86	-13.04	33.82	40.00	-6.18	100	4	QP
96.9300	45.49	-15.21	30.28	43.50	-13.22	100	214	QP
167.7400	42.17	-11.95	30.22	43.50	-13.28	100	143	QP
239.5200	48.34	-12.05	36.29	46.00	-9.71	100	200	QP
431.5800	36.43	-6.95	29.48	46.00	-16.52	100	209	QP
655.6500	32.95	-3.38	29.57	46.00	-16.43	100	359	QP
2390.000	64.63	-4.89	59.74	74.00	-14.26	100	1	peak
2390.000	49.88	-4.89	44.99	54.00	-9.01	100	1	AVG
2402.000	98.85	-4.86	93.99	N/A	N/A	132	287	peak
2402.000	98.22	-4.86	93.36	N/A	N/A	132	287	AVG
4804.000	50.66	0.98	51.64	74.00	-22.36	100	121	peak
4804.000	45.36	0.98	46.34	54.00	-7.66	100	121	AVG
7206.000	46.02	6.56	52.58	74.00	-21.42	300	33	peak
7206.000	36.52	6.56	43.08	54.00	-10.92	300	33	AVG
BLE Mid Channel								
43.5800	45.78	-13.04	32.74	40.00	-7.26	100	42	QP
96.9300	45.49	-15.21	30.28	43.50	-13.22	100	207	QP
167.7400	41.21	-11.95	29.26	43.50	-14.24	100	138	QP
239.5200	48.18	-12.05	36.13	46.00	-9.87	100	181	QP
431.5800	36.32	-6.95	29.37	46.00	-16.63	100	217	QP
953.4400	31.36	2.56	33.92	46.00	-12.08	100	321	QP
2440.000	98.25	-4.78	93.47	N/A	N/A	110	240	peak
2440.000	97.62	-4.78	92.84	N/A	N/A	110	240	AVG
4880.000	51.49	1.24	52.73	74.00	-21.27	116	134	peak
4880.000	47.21	1.24	48.45	54.00	-5.55	116	134	AVG
7320.000	46.31	7.01	53.32	74.00	-20.68	100	22	peak
7320.000	36.04	7.01	43.05	54.00	-10.95	100	22	AVG
BLE High Channel								
30.0000	36.46	-3.26	33.20	40.00	-6.80	100	352	QP
43.5800	46.29	-13.04	33.25	40.00	-6.75	100	55	QP
94.9900	45.71	-15.61	30.10	43.50	-13.40	100	360	QP
167.7400	42.60	-11.95	30.65	43.50	-12.85	100	300	QP
239.5200	48.47	-12.05	36.42	46.00	-9.58	100	184	QP
824.4300	30.89	-0.21	30.68	46.00	-15.32	100	55	QP
2480.000	98.73	-4.68	94.05	N/A	N/A	124	239	peak
2480.000	98.22	-4.68	93.54	N/A	N/A	124	239	AVG
2483.500	64.37	-4.69	59.68	74.00	-14.32	100	118	peak
2483.500	49.87	-4.69	45.18	54.00	-8.82	100	118	AVG
4960.000	48.11	1.51	49.62	74.00	-24.38	114	121	peak
4960.000	41.26	1.51	42.77	54.00	-11.23	114	121	AVG
7440.000	46.75	7.49	54.24	74.00	-19.76	100	225	peak
7440.000	37.02	7.49	44.51	54.00	-9.49	100	225	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported

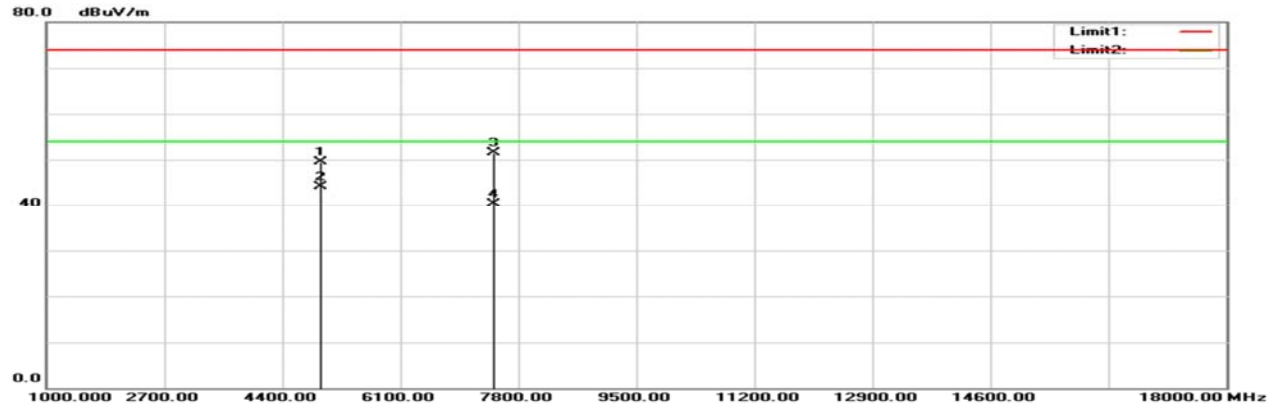
BLE Mode (2M)

Horizontal (*worst case is BLE mode high channel*)

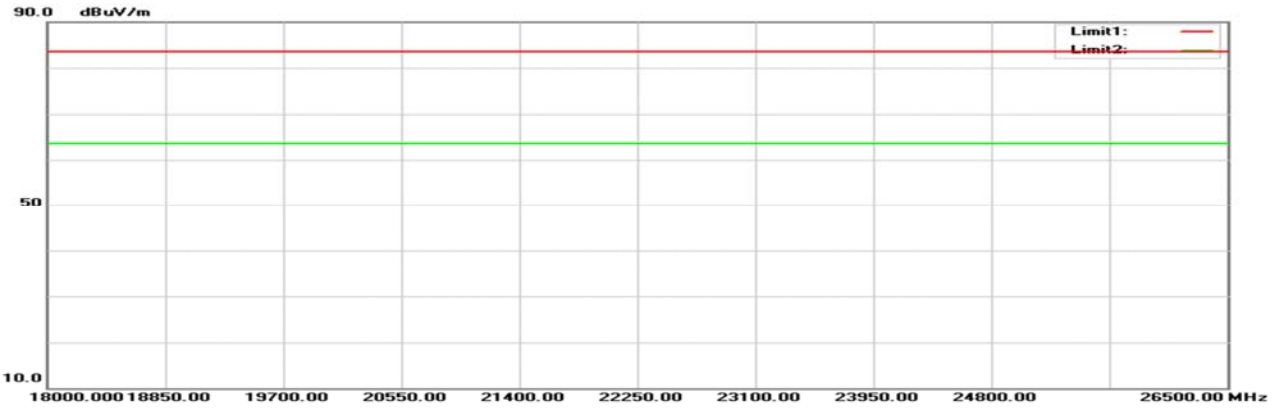
30MHz-1GHz:



1GHz-18GHz:

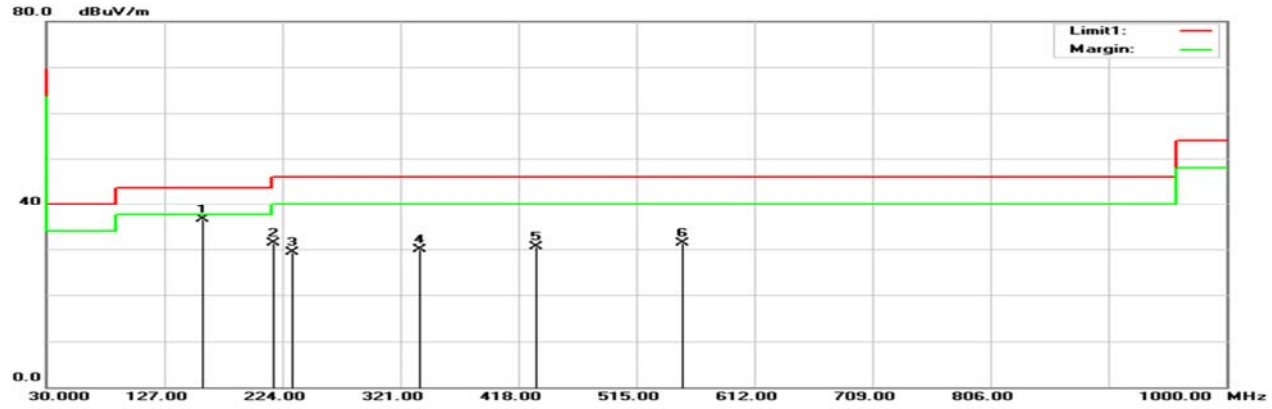


18GHz-26.5GHz:

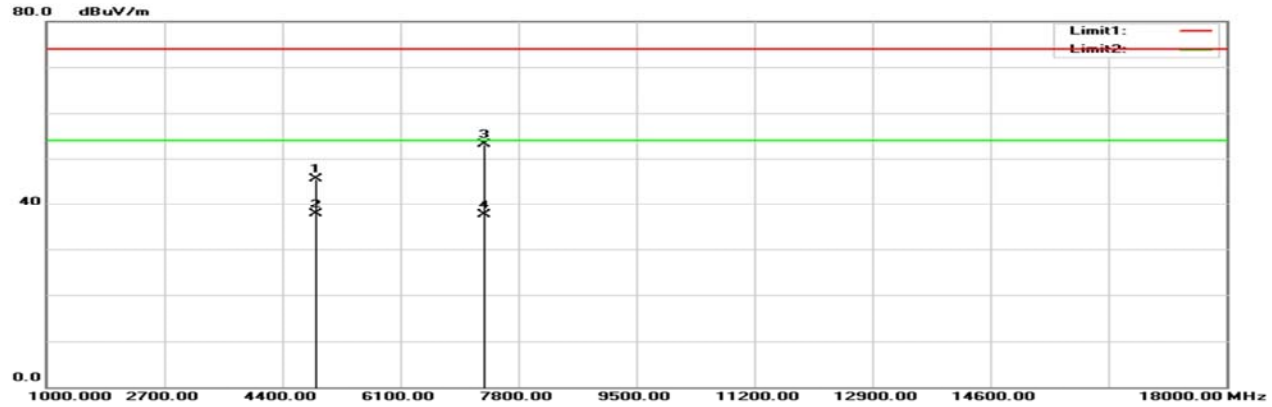


Vertical (*worst case is BLE mode middle channel*)

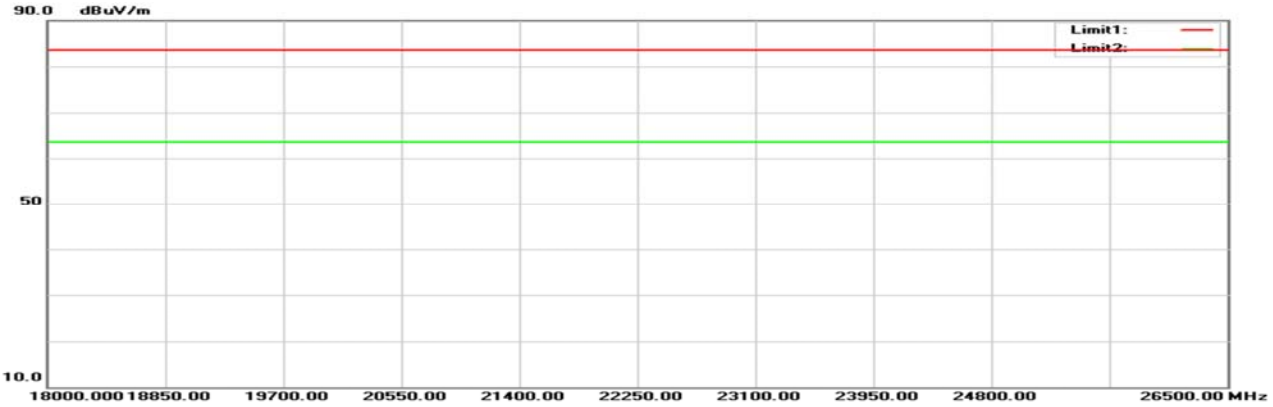
30MHz-1GHz:



1GHz-18GHz:



18GHz-26.5GHz:



Horizontal

Frequency (MHz)	Reading (dBμV)	Correct Factor(dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
BLE Low Channel								
156.1000	48.03	-11.30	36.73	43.50	-6.77	100	331	QP
216.2400	54.16	-12.88	41.28	46.00	-4.72	100	182	QP
231.7600	52.29	-12.30	39.99	46.00	-6.01	100	92	QP
336.5200	45.02	-9.11	35.91	46.00	-10.09	100	133	QP
408.3000	45.90	-7.58	38.32	46.00	-7.68	100	165	QP
552.8300	41.14	-4.94	36.20	46.00	-9.80	100	247	QP
2337.740	65.40	-5.00	60.40	74.00	-13.60	100	334	peak
2337.740	52.74	-5.00	47.74	54.00	-6.26	100	334	AVG
2402.000	97.25	-4.86	92.39	N/A	N/A	100	201	peak
2402.000	95.25	-4.86	90.39	N/A	N/A	100	201	AVG
4804.000	49.79	0.98	50.77	74.00	-23.23	100	313	peak
4804.000	43.17	0.98	44.15	54.00	-9.85	100	313	AVG
7206.000	48.69	6.56	55.25	74.00	-18.75	121	357	peak
7206.000	39.54	6.56	46.10	54.00	-7.90	121	357	AVG
BLE Mid Channel								
156.1000	48.06	-11.30	36.76	43.50	-6.74	100	44	QP
231.7600	52.52	-12.30	40.22	46.00	-5.78	100	82	QP
312.2700	42.46	-9.62	32.84	46.00	-13.16	100	24	QP
336.5200	44.66	-9.11	35.55	46.00	-10.45	100	19	QP
408.3000	46.09	-7.58	38.51	46.00	-7.49	100	282	QP
552.8300	40.70	-4.94	35.76	46.00	-10.24	100	84	QP
2440.000	97.48	-4.78	92.70	N/A	N/A	147	312	peak
2440.000	96.34	-4.78	91.56	N/A	N/A	147	312	AVG
4880.000	48.88	1.24	50.12	74.00	-23.88	100	196	peak
4880.000	43.04	1.24	44.28	54.00	-9.72	100	196	AVG
7320.000	46.53	7.01	53.54	74.00	-20.46	129	3	peak
7320.000	36.11	7.01	43.12	54.00	-10.88	129	3	AVG
BLE High Channel								
232.7300	53.69	-12.27	41.42	46.00	-4.58	100	91	QP
254.0700	49.39	-11.80	37.59	46.00	-8.41	100	289	QP
336.5200	44.26	-9.11	35.15	46.00	-10.85	100	19	QP
408.3000	45.42	-7.58	37.84	46.00	-8.16	100	274	QP
456.8000	45.04	-6.46	38.58	46.00	-7.42	100	299	QP
552.8300	40.44	-4.94	35.50	46.00	-10.50	100	75	QP
2480.000	97.69	-4.68	93.01	N/A	N/A	195	327	peak
2480.000	96.42	-4.68	91.74	N/A	N/A	195	327	AVG
2483.500	63.44	-4.69	58.75	74.00	-15.25	100	312	peak
2483.500	49.63	-4.69	44.94	54.00	-9.06	100	312	AVG
4960.000	48.01	1.51	49.52	74.00	-24.48	100	205	peak
4960.000	42.54	1.51	44.05	54.00	-9.95	100	205	AVG
7440.000	43.97	7.49	51.46	74.00	-22.54	107	329	peak
7440.000	32.78	7.49	40.27	54.00	-13.73	107	329	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported

Vertical

Frequency (MHz)	Reading (dBμV)	Correct Factor(dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
BLE Low Channel								
157.0700	47.99	-11.31	36.68	43.50	-6.82	100	225	QP
216.2400	43.06	-12.88	30.18	46.00	-15.82	100	163	QP
278.3200	35.28	-10.16	25.12	46.00	-20.88	100	27	QP
336.5200	39.28	-9.11	30.17	46.00	-15.83	100	159	QP
432.5500	37.44	-7.00	30.44	46.00	-15.56	100	311	QP
552.8300	37.14	-4.94	32.20	46.00	-13.80	100	85	QP
2337.740	65.89	-5.00	60.89	74.00	-13.11	100	285	peak
2337.740	54.40	-5.00	49.40	54.00	-4.60	100	285	AVG
2402.000	100.25	-4.86	95.39	N/A	N/A	112	330	peak
2402.000	98.66	-4.86	93.80	N/A	N/A	112	330	AVG
4804.000	48.08	0.98	49.06	74.00	-24.94	120	224	peak
4804.000	43.31	0.98	44.29	54.00	-9.71	120	224	AVG
7206.000	44.87	6.56	51.43	74.00	-22.57	100	127	peak
7206.000	35.17	6.56	41.73	54.00	-12.27	100	127	AVG
7206.020	34.47	6.56	41.03	74.00	-32.97	100	127	peak
BLE Mid Channel								
158.0400	47.89	-11.31	36.58	43.50	-6.92	100	122	QP
216.2400	44.14	-12.88	31.26	46.00	-14.74	100	59	QP
231.7600	41.66	-12.30	29.36	46.00	-16.64	100	37	QP
336.5200	38.98	-9.11	29.87	46.00	-16.13	100	71	QP
432.5500	37.43	-7.00	30.43	46.00	-15.57	100	2	QP
552.8300	36.17	-4.94	31.23	46.00	-14.77	100	111	QP
2440.000	99.81	-4.78	95.03	N/A	N/A	123	290	peak
2440.000	98.62	-4.78	93.84	N/A	N/A	123	290	AVG
4880.000	44.32	1.24	45.56	74.00	-28.44	100	269	peak
4880.000	36.45	1.24	37.69	54.00	-16.31	100	269	AVG
7320.000	46.11	7.01	53.12	74.00	-20.88	109	110	peak
7320.000	30.57	7.01	37.58	54.00	-16.42	109	110	AVG
BLE High Channel								
158.0400	47.98	-11.31	36.67	43.50	-6.83	100	118	QP
216.2400	43.07	-12.88	30.19	46.00	-15.81	100	50	QP
243.4000	40.62	-12.05	28.57	46.00	-17.43	100	154	QP
336.5200	38.60	-9.11	29.49	46.00	-16.51	100	73	QP
432.5500	36.91	-7.00	29.91	46.00	-16.09	100	65	QP
552.8300	36.44	-4.94	31.50	46.00	-14.50	100	103	QP
2480.000	98.41	-4.68	93.73	N/A	N/A	135	300	peak
2480.000	97.23	-4.68	92.55	N/A	N/A	135	300	AVG
2483.500	63.38	-4.69	58.69	74.00	-15.31	100	231	peak
2483.500	50.64	-4.69	45.95	54.00	-8.05	100	231	AVG
4960.000	46.42	1.51	47.93	74.00	-26.07	119	195	peak
4960.000	40.03	1.51	41.54	54.00	-12.46	119	195	AVG
7440.000	42.85	7.49	50.34	74.00	-23.66	100	212	peak
7440.000	31.46	7.49	38.95	54.00	-15.05	100	212	AVG

Result = Reading + Correct Factor
Margin = Result – Limit
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain
Spurious emissions more than 20 dB below the limit were not reported

******* END OF REPORT *******