FCC Part 15.247

TEST REPORT

For

I/O INTERCONNECT INC.

5F, No.19-3, Sanchong Rd., Nangang District, Taipei 115, Taiwan

FCC ID: 2ACNORA842

Report Type:	**Product Type:**
Original Report	DataSav™

Report Producer:	Jane Lee
Report Number:	RXZ1803009-00B
Report Date:	2018-04-02
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REVISION HISTORY

Revision	Issue Date	Description
1.0	2018.03.30	Original

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1 General Information

1.1 Product Description for Equipment Under Test (EUT)

Applicant:	I/O INTERCONNECT INC. 5F, No.19-3, Sanchong Rd., Nangang District, Taipei 115, Taiwan
Manufacturer:	I/O INTERCONNECT INC. 5F, No.19-3, Sanchong Rd., Nangang District, Taipei 115, Taiwan
Product:	DataSav™
Model:	RA842
Trade Name:	MediaGear
Frequency Range:	BLE: 2402 ~ 2480 MHz IEEE 802.11b/g/n HT20 Mode: 2412 ~ 2462 MHz IEEE 802.11n HT40 Mode: 2422 ~ 2452 MHz
Transmit Power:	BLE Mode: 2.77dBm (0.0019W) IEEE 802.11b Mode: 15.86dBm (0.0385W) IEEE 802.11g Mode: 18.92dBm (0.0780W) IEEE 802.11n HT20 Mode: 18.98dBm (0.0791W) IEEE 802.11n HT40 Mode: 19.27dBm (0.0845W)
Modulation Technique:	BLE: GFSK IEEE 802.11b: DSSS IEEE 802.11g: OFDM IEEE 802.11n HT20 Mode: OFDM IEEE 802.11n HT40 Mode: OFDM
Transmit Data Rate:	BLE: 1Mbps IEEE 802.11b Mode: 11, 5.5, 2, 1 Mbps IEEE 802.11g Mode: 54, 48, 36, 24, 18, 12, 11 , 9, 6Mbps IEEE 802.11n HT 20 MHz mode: 6.5 - 72.2Mbps IEEE 802.11n HT 40 MHz mode: 13.5 - 150 Mbps
Number of Channels:	BLE: 40 Channels IEEE 802.11b/g / IEEE 802.11n HT20 Mode: 11 Channels IEEE 802.11n HT40 Mode: 7 Channels
Antenna Specification:	BLE: PCB Antenna / Gain: -1.19 dBi WiFi: Chip Antenna / Gain: 1.7 dBi
Voltage Range:	Adapter: I/P: 100-240Vac, 50/60Hz, 0.6A O/P: 5Vdc, 3.0A
Date of Test:	Mar 19, 2018 ~ Apr 02, 2018

**All measurement and test data in this report was gathered from production sample identifier: 1803009 (Assigned by BACL, Taiwan) The EUT supplied by the applicant was received on 2018-03-19*

1.2 Objective

This report is prepared on behalf of *I/O INTERCONNECT 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)

FCC Part 15.209 DCD submission with FCC ID:2ACNORA842

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 WIFI mode, there are totally 11 channels.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437		

For 802.11 b/g/n20 Modes were testd with channel 1, 6 and 11
For 802.11n40 Mode were testd with channel 3, 6 and 9

For BLE mode, there are totally 40 channels.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2402	20	2440
2	2404	21	2442
3	2406	-	-
-	-	38	2476
-	-	39	2478
19	2438	40	2480

For BLE Modes were testd with channel 1, 20 and 40

2.2 Equipment Modifications

No modification was made to the EUT

2.3 EUT Exercise Software

Used “SP_META” software.

WIFI

Test Software Version		Engineering Mode		
Test Frequency		Low	Mid	High
Power Level Setting	B Mode	26	28	26
	G Mode	21	23	21
	N20 Mode	21	23	21
	N40 Mode	25	27	25

The EUT was configured for testing in an engineering mode which was provided by the manufacturer.
The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all data rates bandwidths, and modulations.

BLE: 1 Mbps
802.11b: 1Mbps
802.11g: 6Mbps
802.11n ht20: MCS0
802.11n ht40: MCS0

2.4 Support Equipment List and Details

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

2.5 External Cable List and Details

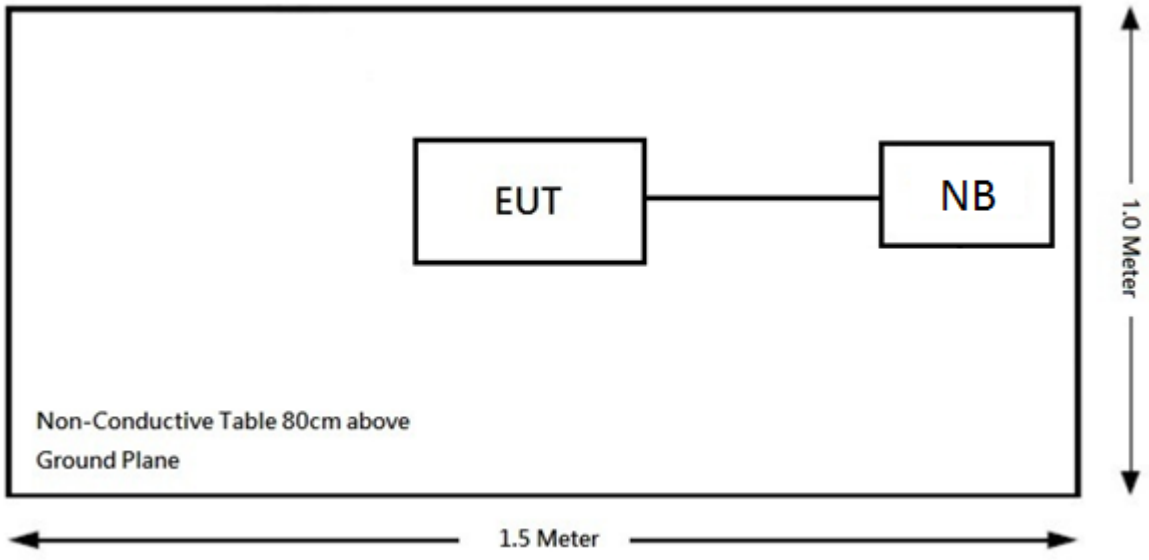
Cable Description	Length (m)	From	To
Micro USB Cable	1.5	NB	EUT

2.6 Block Diagram of Test Setup

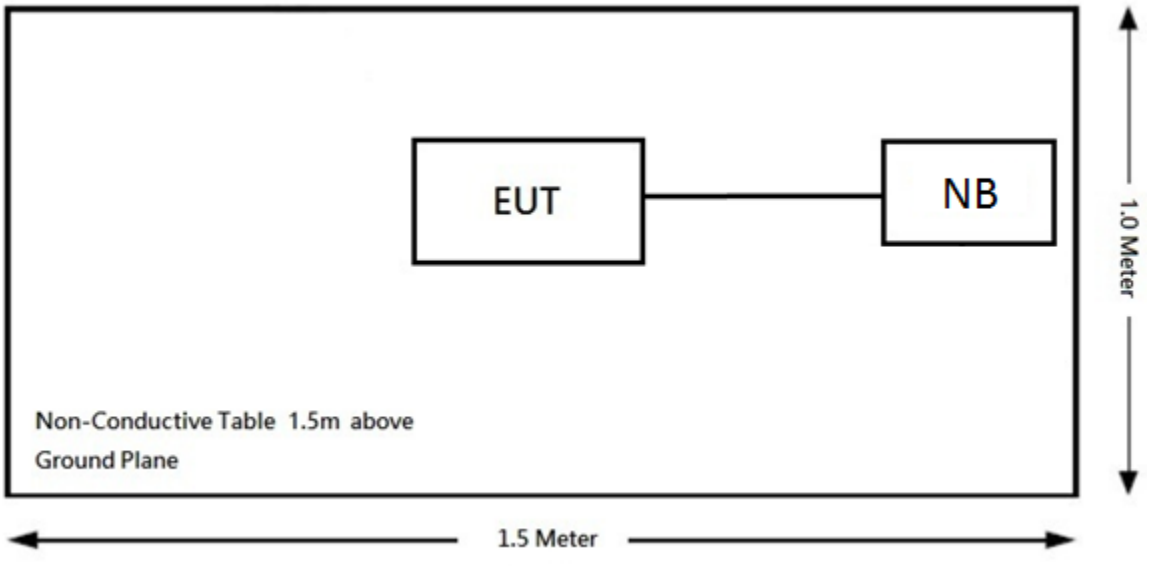
See test photographs attached in Exhibit A for the actual connections between EUT and support equipment.

Radiation:

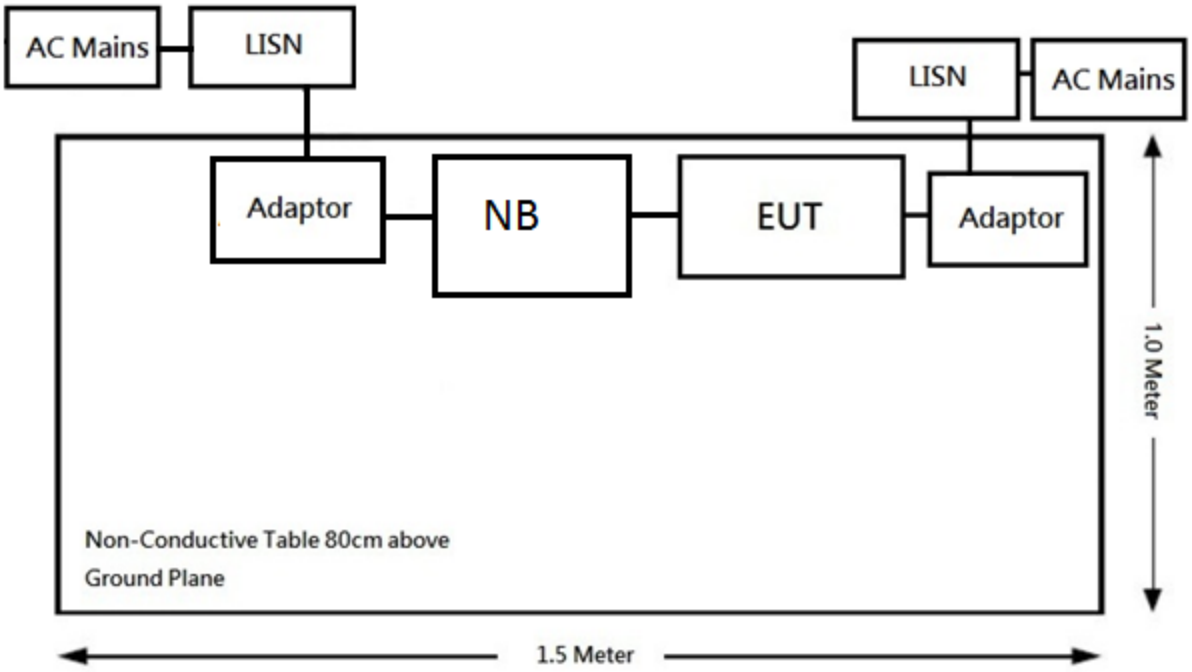
Below 1GHz:



Above 1GHz:



Conduction:


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

2.7 Duty Cycle

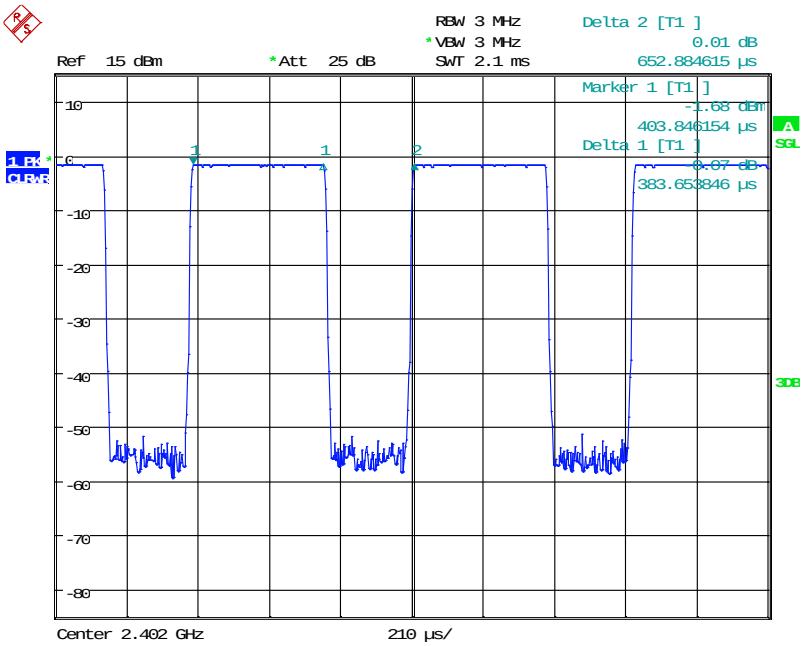
According to KDB 558074 D01 DTS Meas Guidance v04 section 6.0:
All measurements are to be performed with the EUT transmitting at 100% duty cycle at its maximum power control level; however, if 100% duty cycle cannot be achieved, measurements of duty cycle, x, and maximumpower transmission duration, T,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

Radio Mode	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
BLE	0.383	0.652	59	2.29
802.11b	8.441	8.637	98	0.09
802.11g	1.418	1.586	89	0.51
802.11n20	1.339	1.505	89	0.51
802.11n40	0.659	0.794	83	0.81

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

Please refer to the following plots.

BLE Mode



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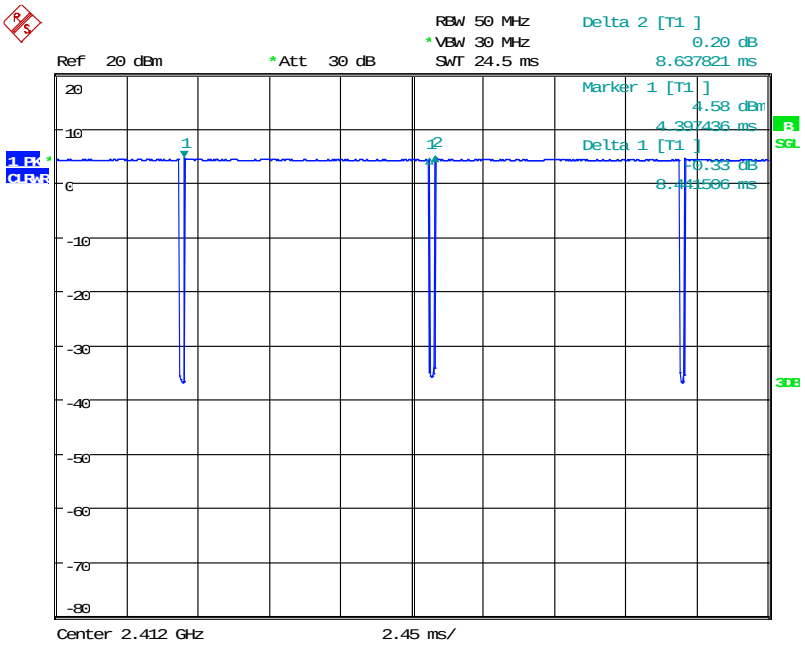
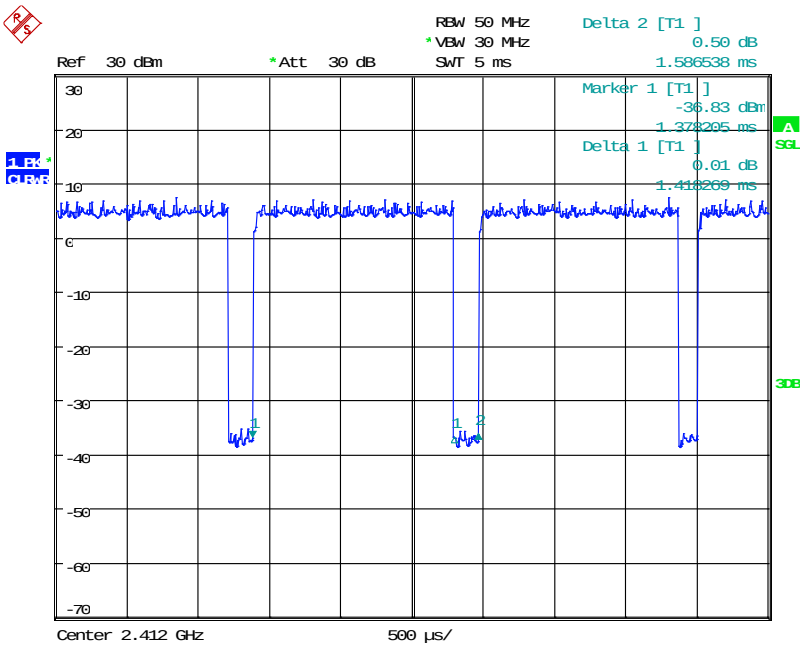
B Mode



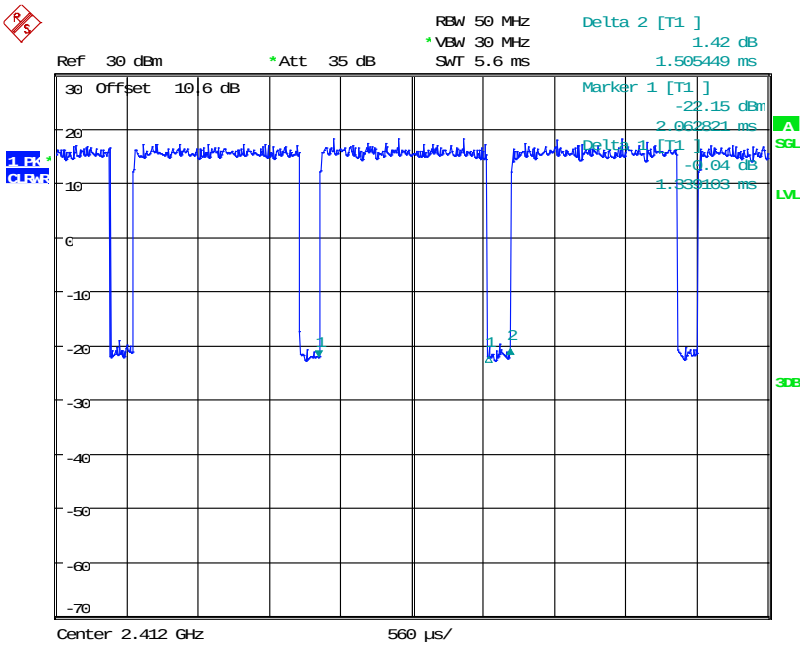
Date: 27.MAR.2018 15:36:40

G Mode



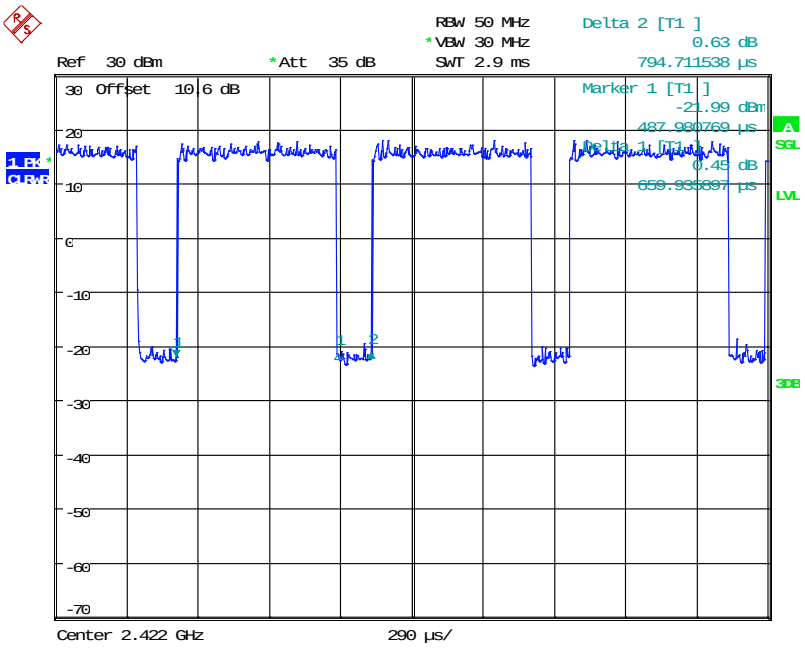
Date: 27.MAR.2018 16:14:37

N20 Mode



Date: 27.MAR.2018 16:44:41

N40 Mode



Date: 27.MAR.2018 16:46:22

3 Summary of Test Results

FCC Rules	Description of Test	Result
§15.247(i), § 1.1310, § 2.1091	Maximum Permissible Exposure (MPE)	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

4 FCC §15.247(i), §1.1310, § 2.1091 - Maximum Permissible Exposure (MPE)

4.1 Applicable Standard

According to subpart 15.247(i)and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*($180/f^2$)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Predication of MPE limit at a given distance
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

4.2 Measurement Result

MPE evaluation:

Mode	Frequency Range (MHz)	Antenna Gain		Target Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
BLE	2402-2480	-1.19	0.76	2.5	1.778	20	0.0003	1
WIFI	2412-2462	1.7	1.48	14.0	25.12	20	0.007	1

BLE and WIFI will not be launched at the same time, so there will be no co-located.

Result: MPE evaluation meet 20 cm the requirement of standard.

5 FCC §15.203 – Antenna Requirements

5.1 Applicable Standard

According to § 15.203,

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna does not exceed 6 dBi.

5.2 Antenna List and Details

Manufacturer	Model	Type	Antenna Gain	Result
I/O INTERCONNECT INC.	RA842	PCB Antenna	-1.19 dBi	Compliance
INPAQ Technology Co., LTD.	ACA-2012-A1-CC-S	Chip Antenna	1.7 dBi	Compliance

The EUT has two internal antenna arrangement, which was permanently attached, fulfill the requirement of this section.

6 FCC §15.207 - AC Line Conducted Emissions

6.1 Applicable Standard

According to FCC §15.207 Conducted limits:

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56 Note 1	56 to 46 Note 2
0.5-5	56	46
5-30	60	50

Note 1: Decreases with the logarithm of the frequency.
Note 2: A linear average detector is required

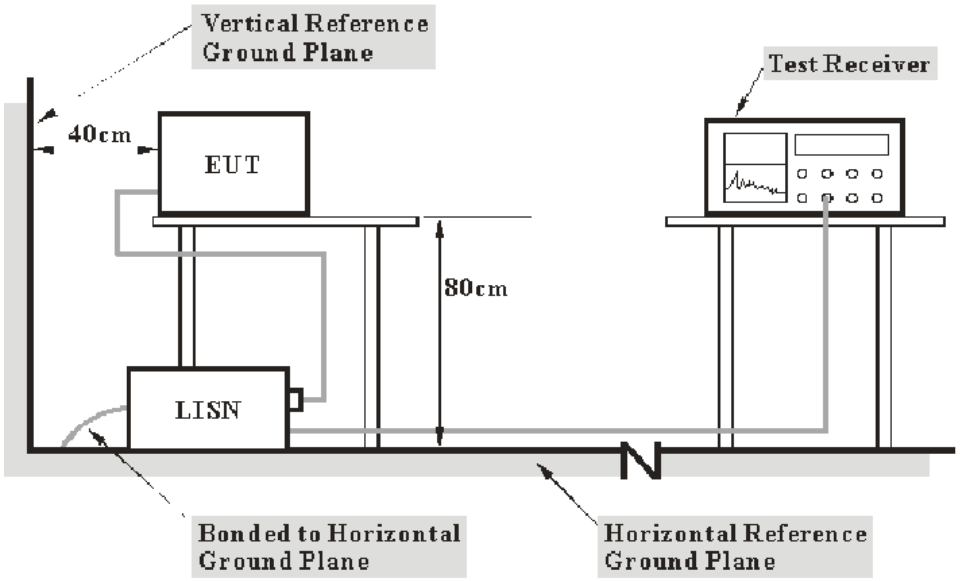
6.2 Measurement Uncertainty

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)

6.3 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.

6.4 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	IF B/W
150 kHz - 30 MHz	9 kHz

6.5 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.

6.6 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

6.7 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	2017/08/11	2018/08/10
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 of the calibrations on the equipment items listed above were traceable to the SI System of Units via the R.O.C. Center for Measurement Standards of the Electronics Testing Center, Taiwan (ETC) or to another internationally recognized National Metrology Institute (NMI), and were compliant with the current Taiwan Accreditation Foundation (TAF) requirements.*

6.8 Test Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	58 %
ATM Pressure:	1008 hPa

The testing was performed by Kevin Kao on 2018-04-02.

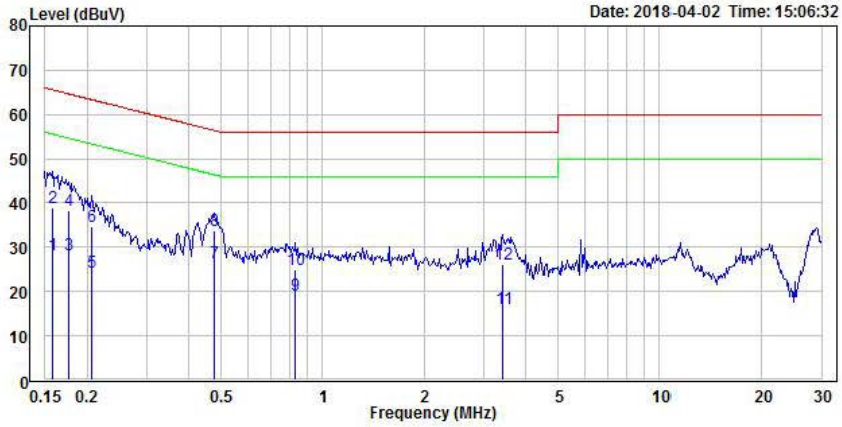
6.9 Test Results

Please refer to the following plots and tables.

Mode: *Transmitting*

Main: AC 120V/60 Hz, Line

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

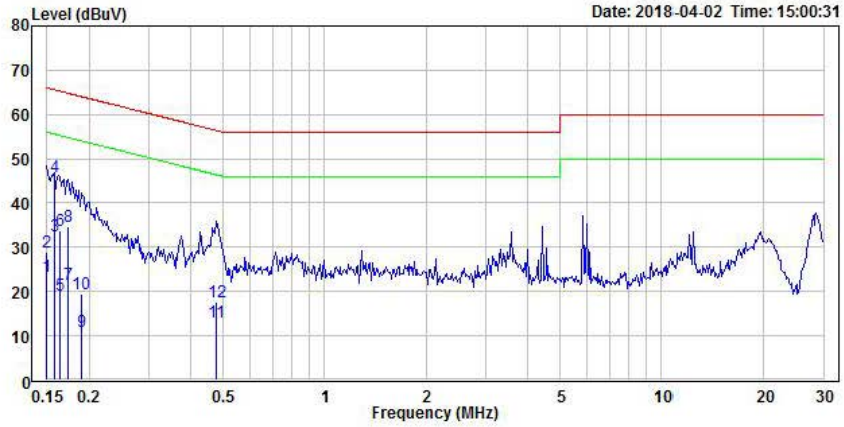


Condition: Line
EUT :
Model
Note :
Power :

	Freq	Level	Limit Line	Over Limit	Factor	Read Level	Remark	Pol/Phase
	MHz	dBuV	dBuV	dB	dB	dBuV		
1	0.157	28.35	55.60	-27.25	19.50	8.85	Average	Line
2	0.157	38.83	65.60	-26.77	19.50	19.33	QP	Line
3	0.176	28.34	54.68	-26.34	19.50	8.84	Average	Line
4	0.176	38.44	64.68	-26.24	19.50	18.94	QP	Line
5	0.206	24.21	53.35	-29.14	19.50	4.71	Average	Line
6	0.206	34.60	63.35	-28.75	19.50	15.10	QP	Line
7	0.476	26.34	46.40	-20.06	19.51	6.83	Average	Line
8	0.476	33.75	56.40	-22.65	19.51	14.24	QP	Line
9	0.832	19.08	46.00	-26.92	19.52	-0.44	Average	Line
10	0.832	24.87	56.00	-31.13	19.52	5.35	QP	Line
11	3.435	16.07	46.00	-29.93	19.64	-3.57	Average	Line
12	3.435	26.10	56.00	-29.90	19.64	6.46	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 :

	Freq	Level	Limit Line	Over Limit	Factor	Read Level	Remark	Pol/Phase
	MHz	dBuV	dBuV	dB	dB	dBuV		
1	0.150	23.39	56.00	-32.61	19.63	3.76	Average	Neutral
2	0.150	28.81	66.00	-37.19	19.63	9.18	QP	Neutral
3	0.157	32.40	55.60	-23.20	19.63	12.77	Average	Neutral
4	0.157	46.04	65.60	-19.56	19.63	26.41	QP	Neutral
5	0.164	19.30	55.27	-35.97	19.63	-0.33	Average	Neutral
6	0.164	33.71	65.27	-31.56	19.63	14.08	QP	Neutral
7	0.173	21.58	54.81	-33.23	19.63	1.95	Average	Neutral
8	0.173	34.61	64.81	-30.20	19.63	14.98	QP	Neutral
9	0.189	11.05	54.08	-43.03	19.63	-8.58	Average	Neutral
10	0.189	19.56	64.08	-44.52	19.63	-0.07	QP	Neutral
11	0.476	13.14	46.40	-33.26	19.64	-6.50	Average	Neutral
12	0.476	17.62	56.40	-38.78	19.64	-2.02	QP	Neutral

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

7.1 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).

7.2 Measurement Uncertainty

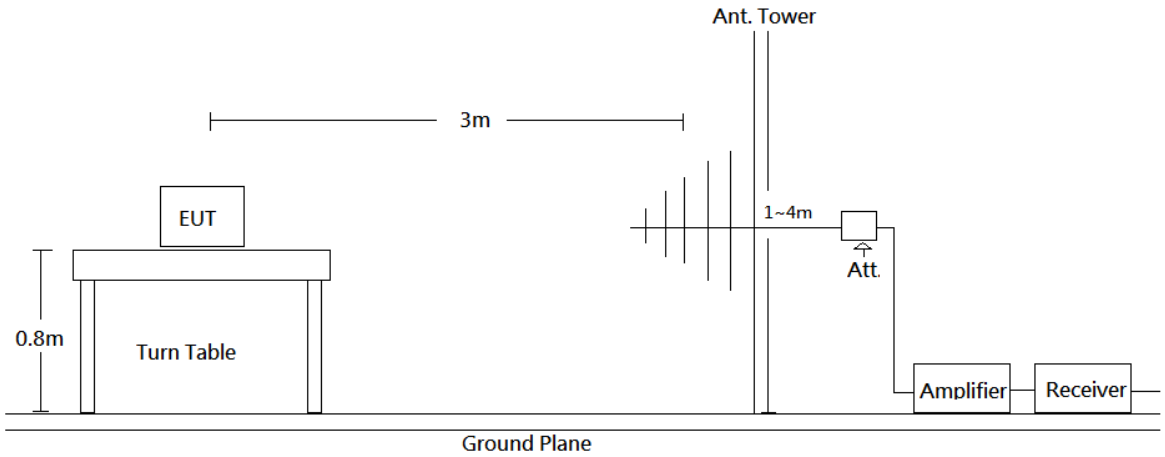
All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency 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.

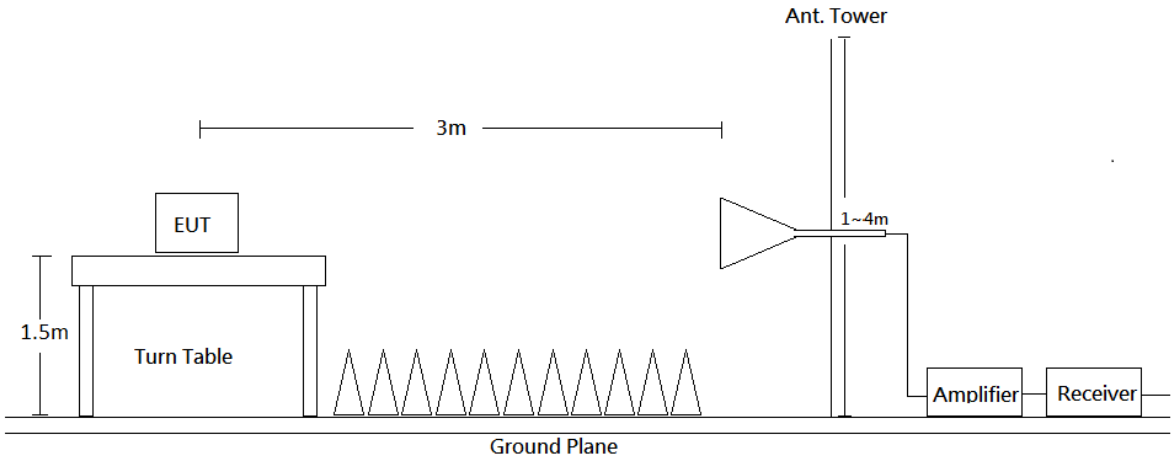
Frequency	Measurement uncertainty
30 MHz~200 MHz	3.76 dB (k=2, 95% level of confidence)
200 MHz~1 GHz	4.12 dB (k=2, 95% level of confidence)
1 GHz~6 GHz	4.84 dB (k=2, 95% level of confidence)
6 GHz~18 GHz	5.16 dB (k=2, 95% level of confidence)
18 GHz~26 GHz	4.84 dB (k=2, 95% level of confidence)
26 GHz~40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

7.3 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.

7.4 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 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

7.5 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.

7.6 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 + Attenuator

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

7.7 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.

7.8 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
Radiation 3M Room (966-A)					
Active Loop Antenna	ETS-Lindgren	6502	00035796	2018/03/02	2019/03/01
Bilog Antenna	Sunol & Mini-Circuits	JB6/UNAT-6+	A050115/15542_01	2017/12/20	2018/12/19
Horn Antenna	EMCO	3115	9311-4158	2017/05/31	2018/05/30
Horn Antenna	ETS-Lindgren	3116	62638	2017/09/04	2018/09/03
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	2018/03/05	2019/03/04
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
NSA	BACL	966-A	N/A	2017/07/24	2018/07/23
VSWR	BACL	966-A	N/A	2017/07/25	2018/07/24
Conducted Room					
Spectrum Analyzer	Rohde & Schwarz	FSU26	200268	2017/05/08	2018/05/07
Attenuator	MINI-CIRCUITS	BW-S10W5+	N/A	2017/12/14	2018/12/13
Cable	WOKEN	SFL402	S02-160323-07	2018/02/12	2019/02/11

***Statement of Traceability:** BACL Corp. attests that all of the calibrations on the equipment items listed above were traceable to the SI System of Units via the R.O.C. Center for Measurement Standards of the Electronics Testing Center, Taiwan (ETC) or to another internationally recognized National Metrology Institute (NMI), and were compliant with the current Taiwan Accreditation Foundation (TAF) requirements.*

7.9 Test Environmental Conditions

Temperature:	24 ° C
Relative Humidity:	57 %
ATM Pressure:	1020 hPa

The testing was performed by Tom Hsu on 2018-03-29.

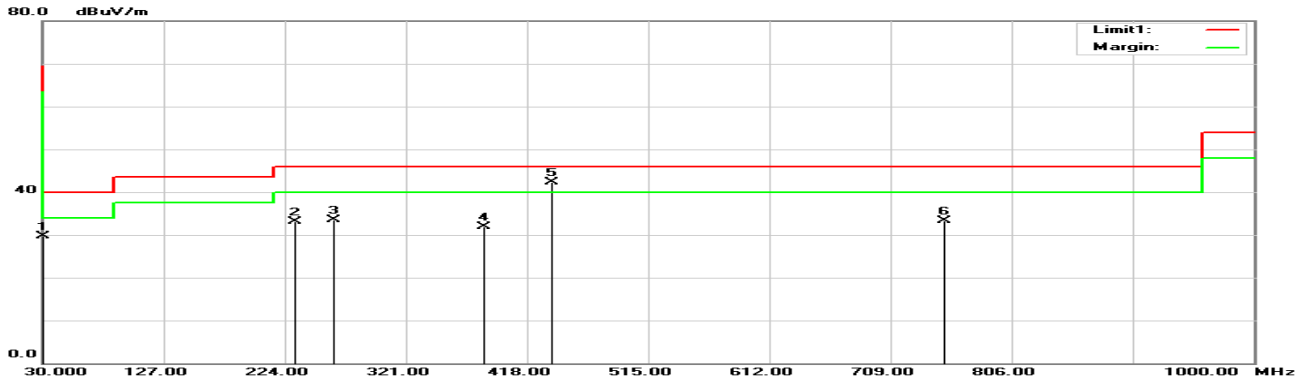
7.10 Test Results

Test Mode: Transmitting

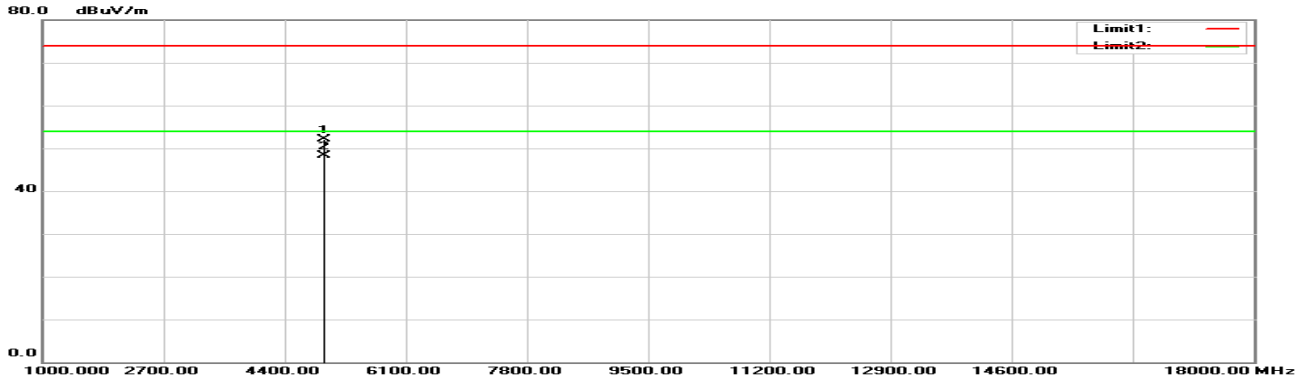
BLE Mode

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

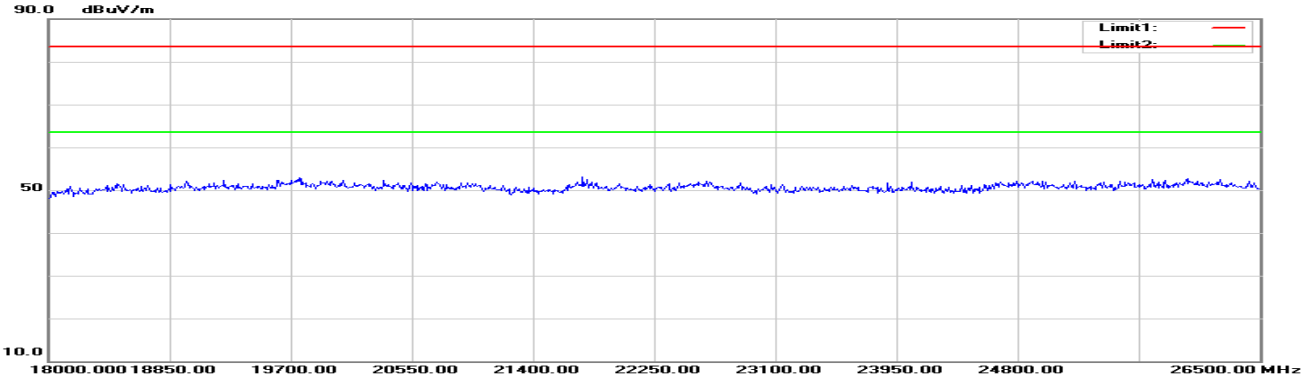
30MHz-1GHz:



1GHz-18GHz:

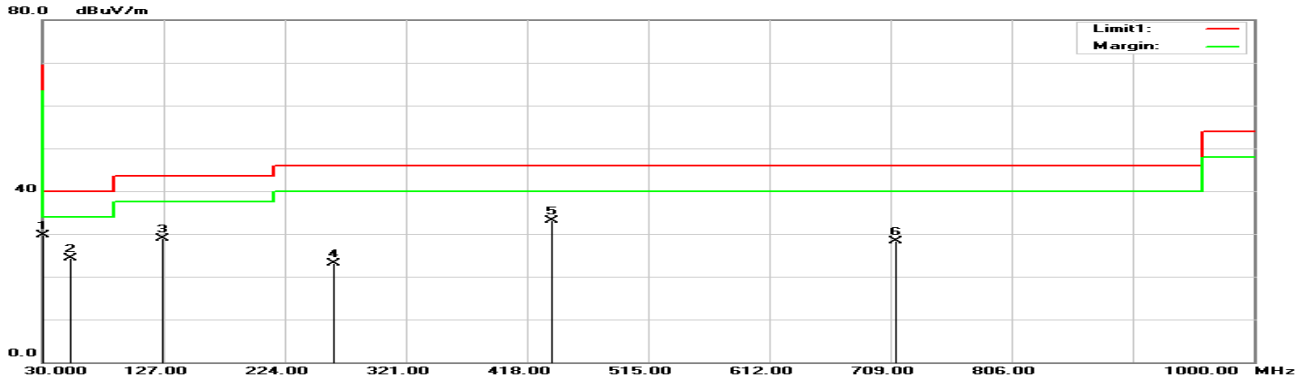


18GHz-26.5GHz:

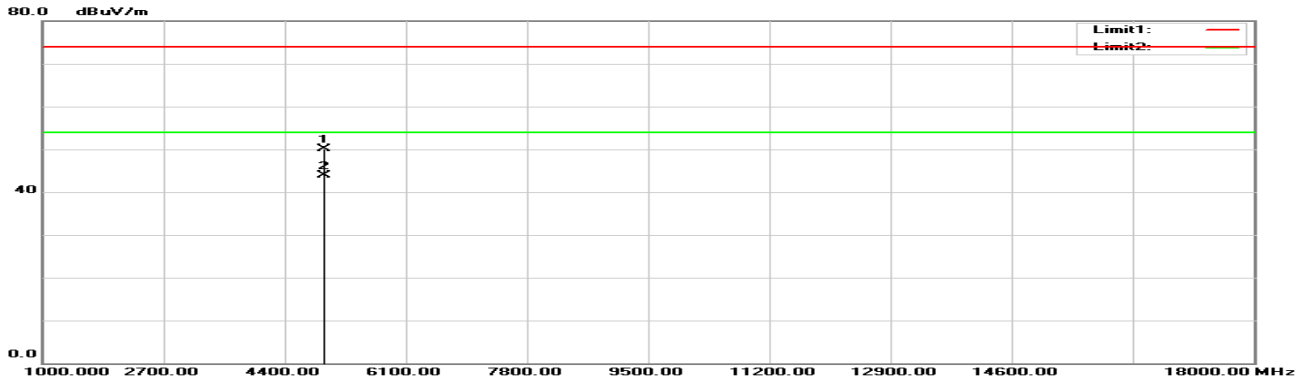


Vertical (*worst case is BLE mode high channel*)

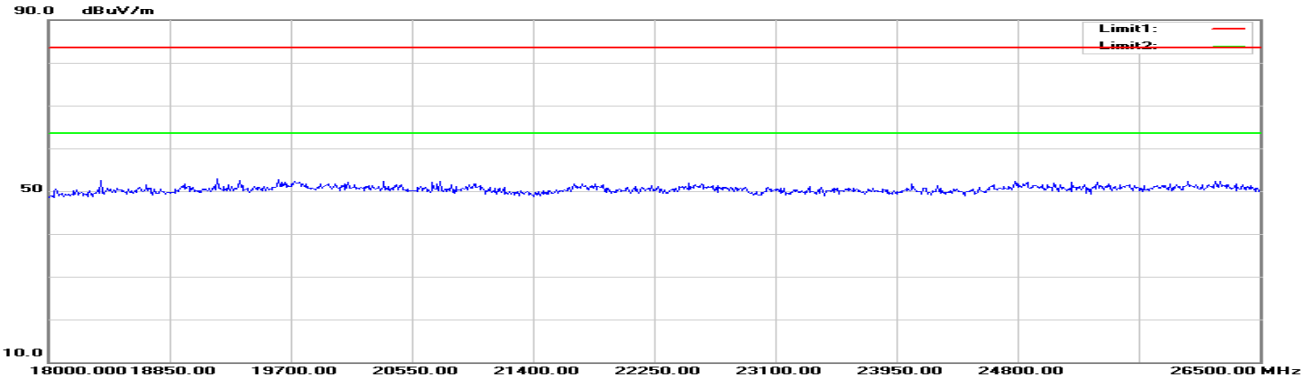
30MHz-1GHz:



1GHz-18GHz:



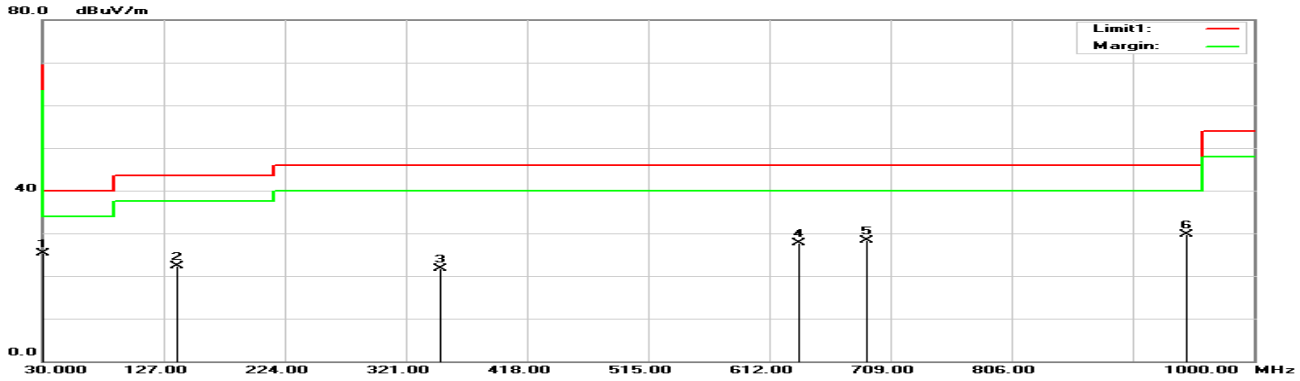
18GHz-26.5GHz:



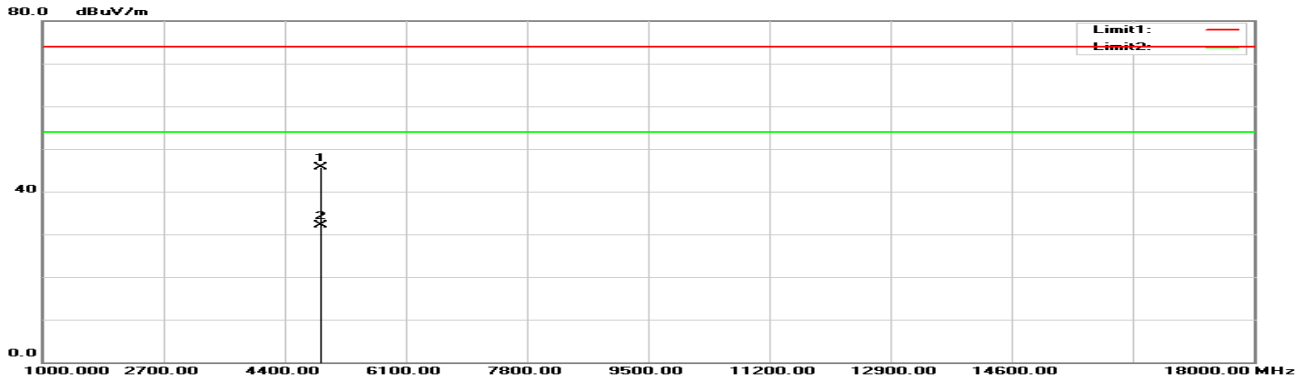
WiFi Mode

Horizontal (*worst case is N40 mode high channel*)

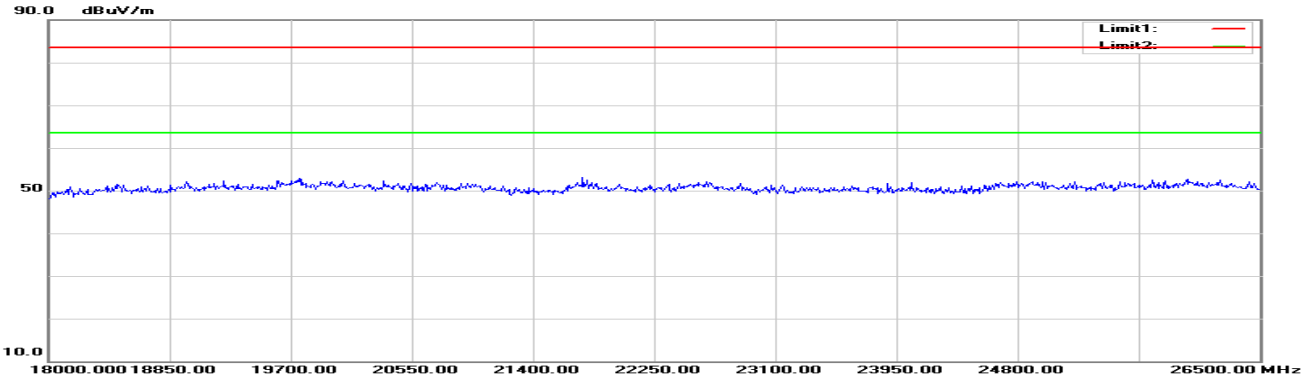
30MHz-1GHz:



1GHz-18GHz:

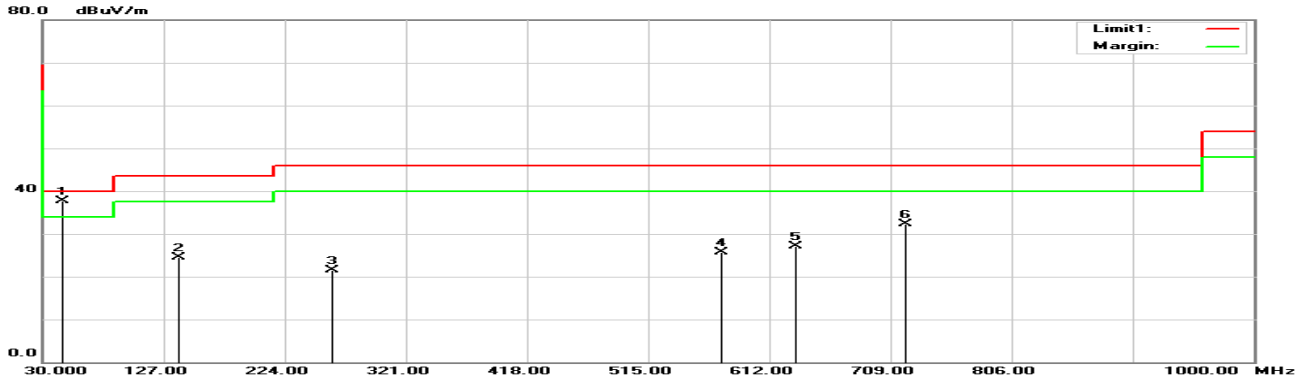


18GHz-26.5GHz:

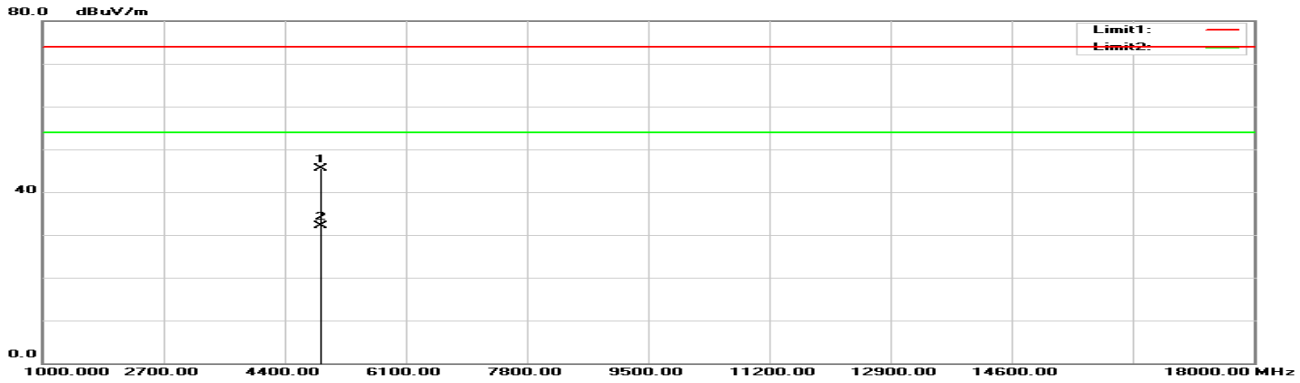


Vertical (*worst case is N40 mode high channel*)

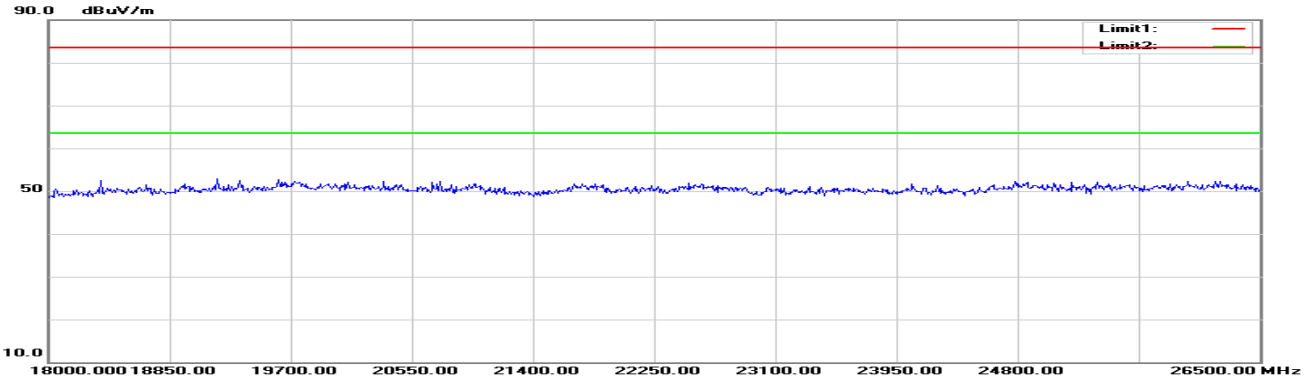
30MHz-1GHz:



1GHz-18GHz:



18GHz-26.5GHz:



BLE Mode

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
Low Channel								
30.0000	31.32	-3.26	28.06	40.00	-11.94	100	301	QP
263.7700	44.04	-10.88	33.16	46.00	-12.84	100	147	QP
384.0500	39.46	-7.91	31.55	46.00	-14.45	100	147	QP
438.3700	48.78	-6.80	41.98	46.00	-4.02	100	126	QP
709.0000	33.22	-2.63	30.59	46.00	-15.41	100	157	QP
747.8000	36.03	-2.13	33.90	46.00	-12.10	100	109	QP
2390.000	64.11	-4.89	59.22	74.00	-14.78	100	359	peak
2390.000	50.63	-4.89	45.74	54.00	-8.26	100	359	AVG
2402.000	100.29	-4.86	95.43	N/A	N/A	130	191	peak
2402.000	99.79	-4.86	94.93	N/A	N/A	130	191	AVG
4804.000	49.63	0.98	50.61	74.00	-23.39	100	184	peak
4804.000	44.21	0.98	45.19	54.00	-8.81	100	184	AVG
Middle Channel								
126.0300	32.07	-10.57	21.50	43.50	-22.00	100	60	QP
232.7300	44.75	-12.20	32.55	46.00	-13.45	100	19	QP
385.0200	39.28	-7.89	31.39	46.00	-14.61	100	16	QP
437.4000	48.78	-6.82	41.96	46.00	-4.04	100	126	QP
709.0000	35.32	-2.63	32.69	46.00	-13.31	100	199	QP
784.6600	32.98	-1.05	31.93	46.00	-14.07	100	357	QP
2440.000	99.92	-4.78	95.14	N/A	N/A	151	344	peak
2440.000	99.02	-4.78	94.24	N/A	N/A	151	344	AVG
4880.000	50.37	1.24	51.61	74.00	-22.39	133	338	peak
4880.000	46.18	1.24	47.42	54.00	-6.58	133	338	AVG
High Channel								
30.0000	32.96	-3.26	29.70	40.00	-10.30	100	74	QP
232.7300	45.37	-12.20	33.17	46.00	-12.83	100	19	QP
263.7700	44.45	-10.88	33.57	46.00	-12.43	100	2	QP
384.0500	39.77	-7.91	31.86	46.00	-14.14	100	359	QP
438.3700	49.11	-6.80	42.31	46.00	-3.69	100	27	QP
752.6500	35.33	-2.03	33.30	46.00	-12.70	100	106	QP
2480.000	99.27	-4.68	94.59	N/A	N/A	148	347	peak
2480.000	98.66	-4.68	93.98	N/A	N/A	148	347	AVG
2483.500	64.19	-4.69	59.50	74.00	-14.50	100	355	peak
2483.500	51.10	-4.69	46.41	54.00	-7.59	100	355	AVG
4960.000	50.67	1.51	52.18	74.00	-21.82	162	342	peak
4960.000	46.74	1.51	48.25	54.00	-5.75	162	342	AVG

Note: 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
Low Channel								
30.9700	37.43	-3.93	33.50	40.00	-6.50	100	181	QP
62.0100	44.72	-17.25	27.47	40.00	-12.53	100	3	QP
127.9700	38.99	-10.57	28.42	43.50	-15.08	100	1	QP
232.7300	36.44	-12.20	24.24	46.00	-21.76	100	100	QP
438.3700	39.49	-6.80	32.69	46.00	-13.31	100	52	QP
717.7300	30.68	-2.51	28.17	46.00	-17.83	100	127	QP
2390.000	64.26	-4.89	59.37	74.00	-14.63	100	181	peak
2390.000	50.68	-4.89	45.79	54.00	-8.21	100	181	AVG
2402.000	102.53	-4.86	97.67	N/A	N/A	164	166	peak
2402.000	101.69	-4.86	96.83	N/A	N/A	164	166	AVG
4804.000	47.36	0.98	48.34	74.00	-25.66	212	32	peak
4804.000	40.18	0.98	41.16	54.00	-12.84	212	32	AVG
Middle Channel								
62.0100	46.04	-17.25	28.79	40.00	-11.21	100	46	QP
128.9400	40.16	-10.57	29.59	43.50	-13.91	100	355	QP
263.7700	35.02	-10.88	24.14	46.00	-21.86	100	88	QP
438.3700	39.57	-6.80	32.77	46.00	-13.23	100	66	QP
803.0900	28.38	-0.53	27.85	46.00	-18.15	100	306	QP
886.5100	31.54	0.80	32.34	46.00	-13.66	100	330	QP
2440.000	102.29	-4.78	97.51	N/A	N/A	167	161	peak
2440.000	101.81	-4.78	97.03	N/A	N/A	100	161	AVG
4880.000	47.21	1.24	48.45	74.00	-25.55	140	360	peak
4880.000	40.17	1.24	41.41	54.00	-12.59	140	360	AVG
High Channel								
30.9700	33.72	-3.93	29.79	40.00	-10.21	100	194	QP
52.3100	40.79	-16.47	24.32	40.00	-15.68	100	350	QP
126.0300	39.44	-10.57	28.87	43.50	-14.63	100	355	QP
263.7700	34.01	-10.88	23.13	46.00	-22.87	100	49	QP
437.4000	39.95	-6.82	33.13	46.00	-12.87	100	58	QP
713.8500	30.79	-2.57	28.22	46.00	-17.78	100	73	QP
2480.000	102.08	-4.68	97.40	N/A	N/A	122	156	peak
2480.000	101.44	-4.68	96.76	N/A	N/A	122	156	AVG
2483.500	64.90	-4.69	60.21	74.00	-13.79	122	156	peak
2483.500	52.36	-4.69	47.67	54.00	-6.33	122	175	AVG
4960.000	48.63	1.51	50.14	74.00	-23.86	275	8	peak
4960.000	42.38	1.51	43.89	54.00	-10.11	275	8	AVG

Note: 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.

WIFI B Mode

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
Low Channel								
30.0000	27.97	-3.26	24.71	40.00	-15.29	100	187	QP
142.5200	32.63	-10.95	21.68	43.50	-21.82	100	88	QP
346.2200	30.24	-8.70	21.54	46.00	-24.46	100	261	QP
510.1500	28.79	-5.51	23.28	46.00	-22.72	100	66	QP
629.4600	31.98	-3.76	28.22	46.00	-17.78	100	44	QP
688.6300	31.01	-2.91	28.10	46.00	-17.90	100	27	QP
2390.000	64.06	-4.89	59.17	74.00	-14.83	100	72	peak
2390.000	49.62	-4.89	44.73	54.00	-9.27	100	72	AVG
2412.000	110.64	-4.84	105.80	N/A	N/A	121	131	peak
2412.000	106.34	-4.84	101.50	N/A	N/A	121	131	AVG
4824.000	45.82	1.05	46.87	74.00	-27.13	100	234	peak
4824.000	34.33	1.05	35.38	54.00	-18.62	100	234	AVG
Middle Channel								
30.0000	28.47	-3.26	25.21	40.00	-14.79	100	219	QP
139.6100	33.49	-10.89	22.60	43.50	-20.90	100	85	QP
345.2500	30.16	-8.73	21.43	46.00	-24.57	100	265	QP
572.2300	28.79	-4.64	24.15	46.00	-21.85	100	103	QP
633.3400	31.72	-3.70	28.02	46.00	-17.98	100	44	QP
694.4500	31.07	-2.82	28.25	46.00	-17.75	100	21	QP
2437.000	111.11	-4.78	106.33	N/A	N/A	120	130	peak
2437.000	106.85	-4.78	102.07	N/A	N/A	120	130	AVG
4874.000	45.01	1.23	46.24	74.00	-27.76	206	121	peak
4874.000	31.56	1.23	32.79	54.00	-21.21	206	121	AVG
High Channel								
30.0000	28.11	-3.26	24.85	40.00	-15.15	100	85	QP
139.6100	34.70	-10.89	23.81	43.50	-19.69	100	88	QP
349.1300	31.06	-8.64	22.42	46.00	-23.58	100	325	QP
629.4600	31.67	-3.76	27.91	46.00	-18.09	100	40	QP
687.6600	31.15	-2.92	28.23	46.00	-17.77	100	35	QP
932.1000	27.49	1.96	29.45	46.00	-16.55	100	13	QP
2462.000	110.31	-4.72	105.59	N/A	N/A	100	132	peak
2462.000	106.23	-4.72	101.51	N/A	N/A	100	132	AVG
2483.500	63.88	-4.69	59.19	74.00	-14.81	100	139	peak
2483.500	49.49	-4.69	44.80	54.00	-9.20	100	139	AVG
4924.000	45.06	1.40	46.46	74.00	-27.54	100	165	peak
4924.000	31.83	1.40	33.23	54.00	-20.77	100	165	AVG

Note: 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
Low Channel								
46.4900	47.88	-14.67	33.21	40.00	-6.79	100	355	QP
141.5500	32.74	-10.93	21.81	43.50	-21.69	100	28	QP
263.7700	32.44	-10.88	21.56	46.00	-24.44	100	269	QP
293.8400	31.16	-9.85	21.31	46.00	-24.69	100	96	QP
629.4600	31.77	-3.76	28.01	46.00	-17.99	100	1	QP
843.8300	28.01	0.09	28.10	46.00	-17.90	100	334	QP
2390.000	63.94	-4.89	59.05	74.00	-14.95	100	194	peak
2390.000	49.35	-4.89	44.46	54.00	-9.54	100	194	AVG
2412.000	105.20	-4.84	100.36	N/A	N/A	109	354	peak
2412.000	101.21	-4.84	96.37	N/A	N/A	109	354	AVG
4824.000	45.48	1.05	46.53	74.00	-27.47	155	82	peak
4824.000	31.96	1.05	33.01	54.00	-20.99	100	82	AVG
Middle Channel								
45.5200	47.04	-14.24	32.80	40.00	-7.20	100	324	QP
138.6400	33.39	-10.87	22.52	43.50	-20.98	100	344	QP
517.9100	29.68	-5.41	24.27	46.00	-21.73	100	342	QP
574.1700	30.14	-4.60	25.54	46.00	-20.46	100	337	QP
632.3700	30.98	-3.71	27.27	46.00	-18.73	100	357	QP
729.3700	31.26	-2.37	28.89	46.00	-17.11	100	279	QP
2437.000	106.89	-4.78	102.11	N/A	N/A	100	354	peak
2437.000	102.70	-4.78	97.92	N/A	N/A	100	354	AVG
4874.000	44.02	1.23	45.25	74.00	-28.75	100	39	peak
4874.000	32.09	1.23	33.32	54.00	-20.68	100	39	AVG
High Channel								
46.4900	47.47	-14.67	32.80	40.00	-7.20	100	315	QP
137.6700	33.78	-10.83	22.95	43.50	-20.55	100	6	QP
525.6700	30.26	-5.31	24.95	46.00	-21.05	100	320	QP
576.1100	30.80	-4.57	26.23	46.00	-19.77	100	46	QP
632.3700	30.90	-3.71	27.19	46.00	-18.81	100	4	QP
686.6900	29.09	-2.93	26.16	46.00	-19.84	100	351	QP
2462.000	104.63	-4.72	99.91	N/A	N/A	100	7	peak
2462.000	100.66	-4.72	95.94	N/A	N/A	100	7	AVG
2483.500	64.24	-4.69	59.55	74.00	-14.45	100	196	peak
2483.500	49.39	-4.69	44.70	54.00	-9.30	100	196	AVG
4924.000	44.92	1.40	46.32	74.00	-27.68	100	257	peak
4924.000	30.78	1.40	32.18	54.00	-21.82	100	257	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.

WIFI G Mode

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
Low Channel								
30.0000	29.16	-3.26	25.90	40.00	-14.10	100	2	QP
140.5800	33.69	-10.92	22.77	43.50	-20.73	100	113	QP
292.8700	29.97	-9.87	20.10	46.00	-25.90	100	151	QP
346.2200	30.32	-8.70	21.62	46.00	-24.38	100	319	QP
634.3100	31.59	-3.69	27.90	46.00	-18.10	100	49	QP
685.7200	31.93	-2.94	28.99	46.00	-17.01	100	30	QP
2390.000	64.80	-4.89	59.91	74.00	-14.09	100	152	peak
2390.000	50.83	-4.89	45.94	54.00	-8.06	100	152	AVG
2412.000	110.53	-4.84	105.69	N/A	N/A	121	130	peak
2412.000	100.49	-4.84	95.65	N/A	N/A	121	130	AVG
4824.000	44.77	1.05	45.82	74.00	-28.18	100	122	peak
4824.000	30.57	1.05	31.62	54.00	-22.38	100	122	AVG
Middle Channel								
30.0000	29.14	-3.26	25.88	40.00	-14.12	100	283	QP
136.7000	33.35	-10.80	22.55	43.50	-20.95	100	96	QP
351.0700	29.69	-8.60	21.09	46.00	-24.91	100	319	QP
631.4000	31.56	-3.72	27.84	46.00	-18.16	100	44	QP
688.6300	31.18	-2.91	28.27	46.00	-17.73	100	38	QP
932.1000	27.00	1.96	28.96	46.00	-17.04	100	358	QP
2437.000	111.27	-4.78	106.49	N/A	N/A	117	129	peak
2437.000	101.32	-4.78	96.54	N/A	N/A	117	129	AVG
4874.000	44.53	1.23	45.76	74.00	-28.24	100	254	peak
4874.000	30.12	1.23	31.35	54.00	-22.65	100	254	AVG
High Channel								
345.2500	29.68	-8.73	20.95	46.00	-25.05	100	256	QP
588.7200	28.53	-4.37	24.16	46.00	-21.84	100	255	QP
631.4000	31.23	-3.72	27.51	46.00	-18.49	100	52	QP
684.7500	30.58	-2.96	27.62	46.00	-18.38	100	35	QP
797.2700	28.17	-0.67	27.50	46.00	-18.50	100	30	QP
927.2500	27.50	1.82	29.32	46.00	-16.68	100	212	QP
2462.000	110.63	-4.72	105.91	N/A	N/A	161	130	peak
2462.000	100.12	-4.72	95.40	N/A	N/A	161	130	AVG
2483.500	64.20	-4.69	59.51	74.00	-14.49	100	75	peak
2483.500	50.68	-4.69	45.99	54.00	-8.01	100	75	AVG
4924.000	44.74	1.40	46.14	74.00	-27.86	100	326	peak
4924.000	30.40	1.40	31.80	54.00	-22.20	100	326	AVG

Note: 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
Low Channel								
46.4900	47.44	-14.67	32.77	40.00	-7.23	100	116	QP
74.6200	43.13	-16.52	26.61	40.00	-13.39	100	199	QP
138.6400	35.48	-10.87	24.61	43.50	-18.89	100	1	QP
578.0500	30.53	-4.54	25.99	46.00	-20.01	100	337	QP
630.4300	30.93	-3.74	27.19	46.00	-18.81	100	1	QP
684.7500	30.09	-2.96	27.13	46.00	-18.87	100	46	QP
2390.000	64.33	-4.89	59.44	74.00	-14.56	100	1	peak
2390.000	50.01	-4.89	45.12	54.00	-8.88	100	1	AVG
2412.000	105.57	-4.84	100.73	N/A	N/A	100	340	peak
2412.000	94.63	-4.84	89.79	N/A	N/A	100	340	AVG
4824.000	44.43	1.05	45.48	74.00	-28.52	100	19	peak
4824.000	30.40	1.05	31.45	54.00	-22.55	100	19	AVG
Middle Channel								
46.4900	47.39	-14.67	32.72	40.00	-7.28	100	298	QP
137.6700	33.50	-10.83	22.67	43.50	-20.83	100	28	QP
283.1700	33.77	-10.06	23.71	46.00	-22.29	100	155	QP
625.5800	32.08	-3.81	28.27	46.00	-17.73	100	1	QP
716.7600	31.46	-2.53	28.93	46.00	-17.07	100	305	QP
916.5800	29.68	1.51	31.19	46.00	-14.81	100	145	QP
2437.000	104.83	-4.78	100.05	N/A	N/A	100	342	peak
2437.000	94.77	-4.78	89.99	N/A	N/A	100	342	AVG
4874.000	44.31	1.23	45.54	74.00	-28.46	100	359	peak
4874.000	30.02	1.23	31.25	54.00	-22.75	100	359	AVG
High Channel								
47.4600	51.98	-15.09	36.89	40.00	-3.11	100	216	QP
138.6400	34.71	-10.87	23.84	43.50	-19.66	100	344	QP
166.7700	33.17	-11.87	21.30	43.50	-22.20	100	323	QP
576.1100	29.99	-4.57	25.42	46.00	-20.58	100	338	QP
631.4000	31.31	-3.72	27.59	46.00	-18.41	100	356	QP
681.8400	29.15	-3.00	26.15	46.00	-19.85	100	338	QP
2462.000	104.58	-4.72	99.86	N/A	N/A	100	6	peak
2462.000	94.10	-4.72	89.38	N/A	N/A	100	6	AVG
2483.500	63.92	-4.69	59.23	74.00	-14.77	100	248	peak
2483.500	49.87	-4.69	45.18	54.00	-8.82	100	248	AVG
4924.000	45.24	1.40	46.64	74.00	-27.36	100	91	peak
4924.000	30.43	1.40	31.83	54.00	-22.17	100	91	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.

WIFI N20 Mode

Horizontal

Frequency (MHz)	Reading (dBµV)	Correct Factor(dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
Low Channel								
140.5800	32.73	-10.92	21.81	43.50	-21.69	100	70	QP
350.1000	30.67	-8.62	22.05	46.00	-23.95	100	273	QP
629.4600	31.04	-3.76	27.28	46.00	-18.72	100	47	QP
685.7200	30.76	-2.94	27.82	46.00	-18.18	100	22	QP
849.6500	29.42	0.17	29.59	46.00	-16.41	100	101	QP
927.2500	26.74	1.82	28.56	46.00	-17.44	100	334	QP
2390.000	65.40	-4.89	60.51	74.00	-13.49	100	155	peak
2390.000	51.08	-4.89	46.19	54.00	-7.81	100	155	AVG
2412.000	110.41	-4.84	105.57	N/A	N/A	120	131	peak
2412.000	100.22	-4.84	95.38	N/A	N/A	120	131	AVG
4824.000	44.55	1.05	45.60	74.00	-28.40	100	308	peak
4824.000	30.39	1.05	31.44	54.00	-22.56	100	308	AVG
Middle Channel								
30.0000	28.75	-3.26	25.49	40.00	-14.51	100	50	QP
140.5800	32.95	-10.92	22.03	43.50	-21.47	100	87	QP
347.1900	30.23	-8.68	21.55	46.00	-24.45	100	65	QP
631.4000	31.29	-3.72	27.57	46.00	-18.43	100	43	QP
686.6900	31.30	-2.93	28.37	46.00	-17.63	100	35	QP
918.5200	27.57	1.57	29.14	46.00	-16.86	100	114	QP
2437.000	110.85	-4.78	106.07	N/A	N/A	118	131	peak
2437.000	100.76	-4.78	95.98	N/A	N/A	118	131	AVG
4874.000	44.43	1.23	45.66	74.00	-28.34	100	85	peak
4874.000	30.06	1.23	31.29	54.00	-22.71	100	85	AVG
High Channel								
30.0000	28.44	-3.26	25.18	40.00	-14.82	100	51	QP
138.6400	34.24	-10.87	23.37	43.50	-20.13	100	71	QP
628.4900	31.13	-3.77	27.36	46.00	-18.64	100	47	QP
694.4500	30.25	-2.82	27.43	46.00	-18.57	100	35	QP
793.3900	28.03	-0.78	27.25	46.00	-18.75	100	85	QP
884.5700	27.78	0.77	28.55	46.00	-17.45	100	47	QP
2462.000	110.01	-4.72	105.29	N/A	N/A	117	129	peak
2462.000	98.99	-4.72	94.27	N/A	N/A	117	129	AVG
2483.500	64.99	-4.69	60.30	74.00	-13.70	100	250	peak
2483.500	50.98	-4.69	46.29	54.00	-7.71	100	250	AVG
4924.000	44.41	1.40	45.81	74.00	-28.19	100	144	peak
4924.000	30.37	1.40	31.77	54.00	-22.23	100	144	AVG

Note: 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
Low Channel								
45.5200	51.26	-14.24	37.02	40.00	-2.98	100	0	QP
139.6100	33.05	-10.89	22.16	43.50	-21.34	100	352	QP
573.2000	30.79	-4.62	26.17	46.00	-19.83	100	342	QP
634.3100	31.23	-3.69	27.54	46.00	-18.46	100	0	QP
687.6600	29.73	-2.92	26.81	46.00	-19.19	100	55	QP
853.5300	28.26	0.24	28.50	46.00	-17.50	100	191	QP
2390.000	64.92	-4.89	60.03	74.00	-13.97	100	111	peak
2390.000	49.95	-4.89	45.06	54.00	-8.94	100	111	AVG
2412.000	104.05	-4.84	99.21	N/A	N/A	100	354	peak
2412.000	93.98	-4.84	89.14	N/A	N/A	100	354	AVG
4824.000	44.52	1.05	45.57	74.00	-28.43	100	127	peak
4824.000	30.47	1.05	31.52	54.00	-22.48	100	127	AVG
Middle Channel								
45.5200	51.46	-14.24	37.22	40.00	-2.78	100	208	QP
138.6400	33.55	-10.87	22.68	43.50	-20.82	100	56	QP
259.8900	32.96	-11.28	21.68	46.00	-24.32	100	129	QP
575.1400	30.75	-4.59	26.16	46.00	-19.84	100	334	QP
636.2500	31.94	-3.65	28.29	46.00	-17.71	100	351	QP
716.7600	37.12	-2.53	34.59	46.00	-11.41	100	325	QP
2437.000	106.16	-4.78	101.38	N/A	N/A	106	354	peak
2437.000	96.13	-4.78	91.35	N/A	N/A	106	354	AVG
4874.000	44.15	1.23	45.38	74.00	-28.62	100	209	peak
4874.000	30.05	1.23	31.28	54.00	-22.72	100	209	AVG
High Channel								
45.5200	51.22	-14.24	36.98	40.00	-3.02	100	352	QP
135.7300	33.38	-10.77	22.61	43.50	-20.89	100	5	QP
347.1900	29.55	-8.68	20.87	46.00	-25.13	100	0	QP
574.1700	31.91	-4.60	27.31	46.00	-18.69	100	345	QP
629.4600	31.45	-3.76	27.69	46.00	-18.31	100	287	QP
683.7800	29.44	-2.97	26.47	46.00	-19.53	100	338	QP
2462.000	103.69	-4.72	98.97	N/A	N/A	100	6	peak
2462.000	93.26	-4.72	88.54	N/A	N/A	100	6	AVG
2483.500	64.04	-4.69	59.35	74.00	-14.65	100	357	peak
2483.500	49.84	-4.69	45.15	54.00	-8.85	100	357	AVG
4924.000	44.57	1.40	45.97	74.00	-28.03	100	298	peak
4924.000	30.39	1.40	31.79	54.00	-22.21	100	298	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.

WIFI N40 Mode

Horizontal

Frequency (MHz)	Reading (dBμV)	Correct Factor(dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Degree (°)	Remark
Low Channel								
30.0000	28.90	-3.26	25.64	40.00	-14.36	100	71	QP
138.6400	33.25	-10.87	22.38	43.50	-21.12	100	88	QP
628.4900	30.89	-3.77	27.12	46.00	-18.88	100	39	QP
687.6600	30.84	-2.92	27.92	46.00	-18.08	100	30	QP
853.5300	27.59	0.24	27.83	46.00	-18.17	100	326	QP
971.8700	26.26	2.87	29.13	54.00	-24.87	100	300	QP
2390.000	71.08	-4.89	66.19	74.00	-7.81	100	130	peak
2390.000	54.76	-4.89	49.87	54.00	-4.13	100	130	AVG
2422.000	109.38	-4.81	104.57	N/A	N/A	119	128	peak
2422.000	102.64	-4.81	97.83	N/A	N/A	119	128	AVG
4844.000	44.64	1.12	45.76	74.00	-28.24	100	183	peak
4844.000	30.85	1.12	31.97	54.00	-22.03	100	183	AVG
Middle Channel								
30.0000	28.75	-3.26	25.49	40.00	-14.51	100	134	QP
136.7000	32.53	-10.80	21.73	43.50	-21.77	100	101	QP
346.2200	29.84	-8.70	21.14	46.00	-24.86	100	62	QP
631.4000	31.43	-3.72	27.71	46.00	-18.29	100	43	QP
684.7500	30.60	-2.96	27.64	46.00	-18.36	100	35	QP
857.4100	27.98	0.30	28.28	46.00	-17.72	100	331	QP
2437.000	109.90	-4.78	105.12	N/A	N/A	167	134	peak
2437.000	99.59	-4.78	94.81	N/A	N/A	167	134	AVG
4874.000	44.66	1.23	45.89	74.00	-28.11	100	246	peak
4874.000	30.50	1.23	31.73	54.00	-22.27	100	246	AVG
High Channel								
30.0000	28.64	-3.26	25.38	40.00	-14.62	100	13	QP
137.6700	33.13	-10.83	22.30	43.50	-21.20	100	67	QP
349.1300	30.30	-8.64	21.66	46.00	-24.34	100	328	QP
636.2500	31.33	-3.65	27.68	46.00	-18.32	100	44	QP
690.5700	31.21	-2.87	28.34	46.00	-17.66	100	27	QP
945.6800	27.36	2.36	29.72	46.00	-16.28	100	203	QP
2452.000	108.93	-4.75	104.18	N/A	N/A	116	130	peak
2452.000	98.95	-4.75	94.20	N/A	N/A	116	130	AVG
2483.500	73.91	-4.69	69.22	74.00	-4.78	116	130	peak
2483.500	55.79	-4.69	51.10	54.00	-2.90	116	130	AVG
4904.000	44.42	1.33	45.75	74.00	-28.25	100	311	peak
4904.000	30.76	1.33	32.09	54.00	-21.91	100	311	AVG

Note: 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
Low Channel								
45.5200	51.27	-14.24	37.03	40.00	-2.97	100	355	QP
137.6700	33.80	-10.83	22.97	43.50	-20.53	100	39	QP
261.8300	31.67	-11.08	20.59	46.00	-25.41	100	129	QP
573.2000	30.72	-4.62	26.10	46.00	-19.90	100	328	QP
632.3700	31.01	-3.71	27.30	46.00	-18.70	100	358	QP
721.6100	31.35	-2.46	28.89	46.00	-17.11	100	3	QP
2390.000	67.01	-4.89	62.12	74.00	-11.88	115	354	peak
2390.000	51.90	-4.89	47.01	54.00	-6.99	115	20	AVG
2422.000	104.23	-4.81	99.42	N/A	N/A	115	354	peak
2422.000	93.93	-4.81	89.12	N/A	N/A	115	354	AVG
4844.000	44.83	1.12	45.95	74.00	-28.05	100	222	peak
4844.000	30.89	1.12	32.01	54.00	-21.99	100	222	AVG
Middle Channel								
45.5200	51.40	-14.24	37.16	40.00	-2.84	100	14	QP
138.6400	34.19	-10.87	23.32	43.50	-20.18	100	357	QP
240.4900	34.32	-12.04	22.28	46.00	-23.72	100	28	QP
632.3700	31.01	-3.71	27.30	46.00	-18.70	100	1	QP
685.7200	29.33	-2.94	26.39	46.00	-19.61	100	1	QP
719.6700	32.58	-2.49	30.09	46.00	-15.91	100	140	QP
2437.000	105.43	-4.78	100.65	N/A	N/A	109	353	peak
2437.000	95.18	-4.78	90.40	N/A	N/A	109	353	AVG
4874.000	44.15	1.23	45.38	74.00	-28.62	100	261	peak
4874.000	30.57	1.23	31.80	54.00	-22.20	100	261	AVG
High Channel								
46.4900	52.35	-14.67	37.68	40.00	-2.32	100	322	QP
138.6400	35.37	-10.87	24.50	43.50	-19.00	100	340	QP
261.8300	32.58	-11.08	21.50	46.00	-24.50	100	138	QP
574.1700	30.28	-4.60	25.68	46.00	-20.32	100	308	QP
633.3400	30.75	-3.70	27.05	46.00	-18.95	100	7	QP
720.6400	34.81	-2.48	32.33	46.00	-13.67	100	63	QP
2452.000	103.36	-4.75	98.61	N/A	N/A	108	354	peak
2452.000	93.44	-4.75	88.69	N/A	N/A	108	354	AVG
2483.500	69.22	-4.69	64.53	74.00	-9.47	108	358	peak
2483.500	52.56	-4.69	47.87	54.00	-6.13	108	358	AVG
4904.000	44.25	1.33	45.58	74.00	-28.42	100	0	peak
4904.000	30.84	1.33	32.17	54.00	-21.83	100	0	AVG

Result = Reading + Correct Factor

Margin = Result – Limit

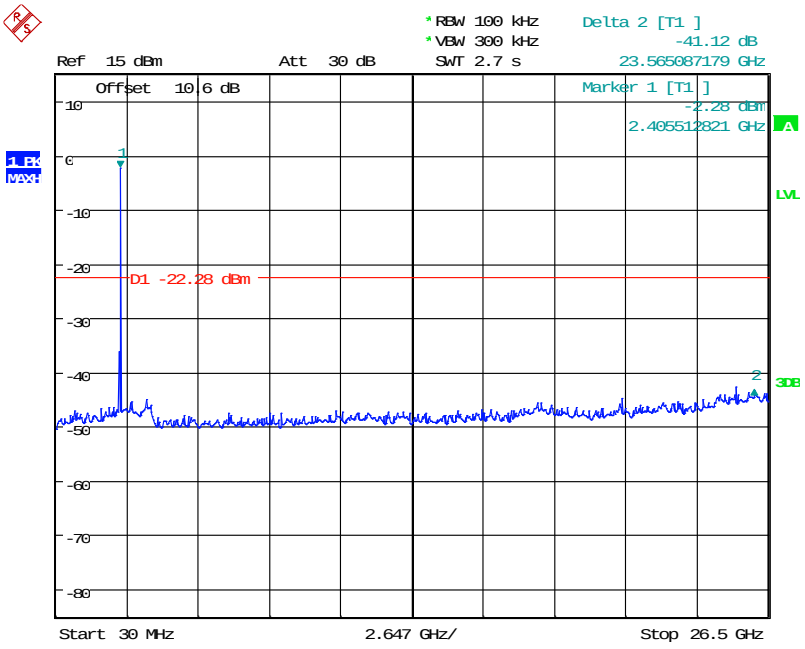
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

Spurious emissions more than 20 dB below the limit were not reported.

Conducted Spurious Emissions:

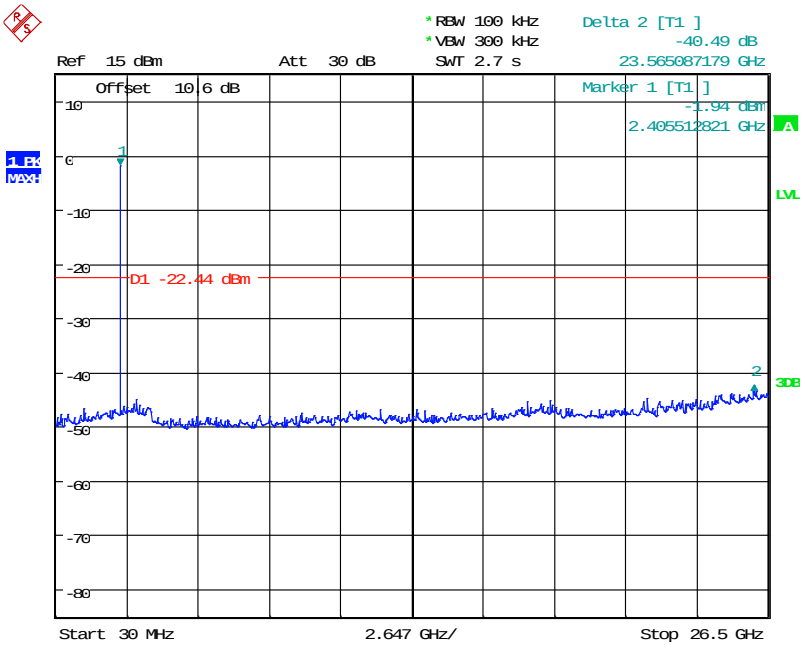
Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
BLE Mode				
Low	2402	41.12	≥ 20	PASS
Mid	2440	40.49	≥ 20	PASS
High	2480	43.26	≥ 20	PASS
B Mode				
Low	2412	40.76	≥ 20	PASS
Mid	2437	40.86	≥ 20	PASS
High	2462	38.90	≥ 20	PASS
G Mode				
Low	2412	33.60	≥ 20	PASS
Mid	2437	34.36	≥ 20	PASS
High	2462	33.80	≥ 20	PASS
N20 Mode				
Low	2412	33.06	≥ 20	PASS
Mid	2437	34.17	≥ 20	PASS
High	2462	32.93	≥ 20	PASS
N40 Mode				
Low	2422	32.34	≥ 20	PASS
Mid	2437	34.79	≥ 20	PASS
High	2452	31.96	≥ 20	PASS

BLE Mode Low Channel



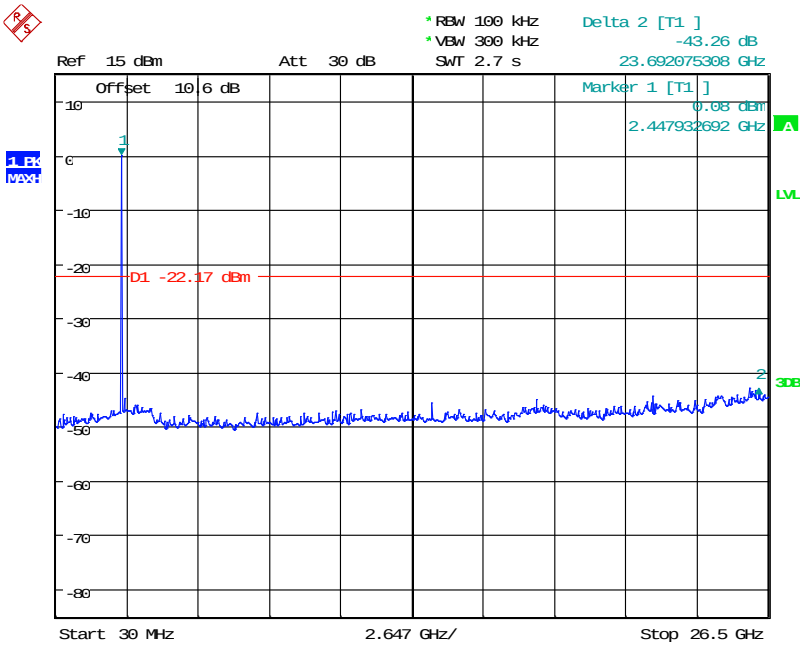
Date: 29.MAR.2018 11:14:02

BLE Mode Middle Channel



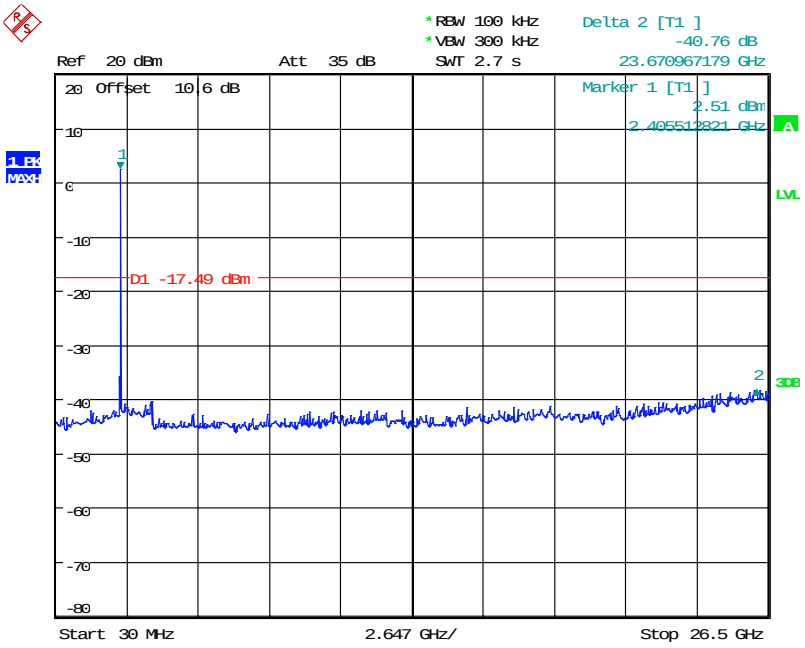
Date: 29.MAR.2018 11:16:40

BLE Mode High Channel



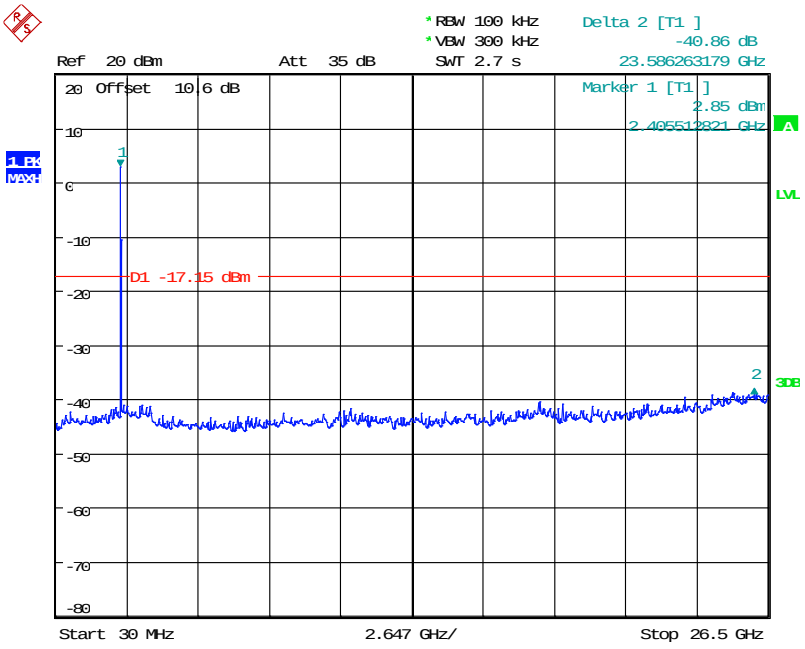
Date: 29.MAR.2018 11:19:06

B Mode Low Channel



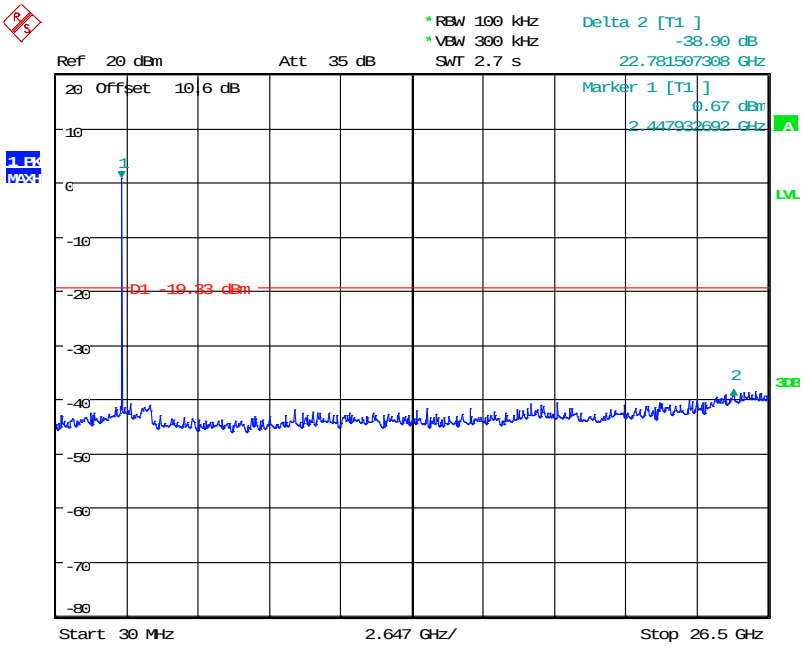
Date: 27.MAR.2018 16:01:54

B Mode Middle Channel



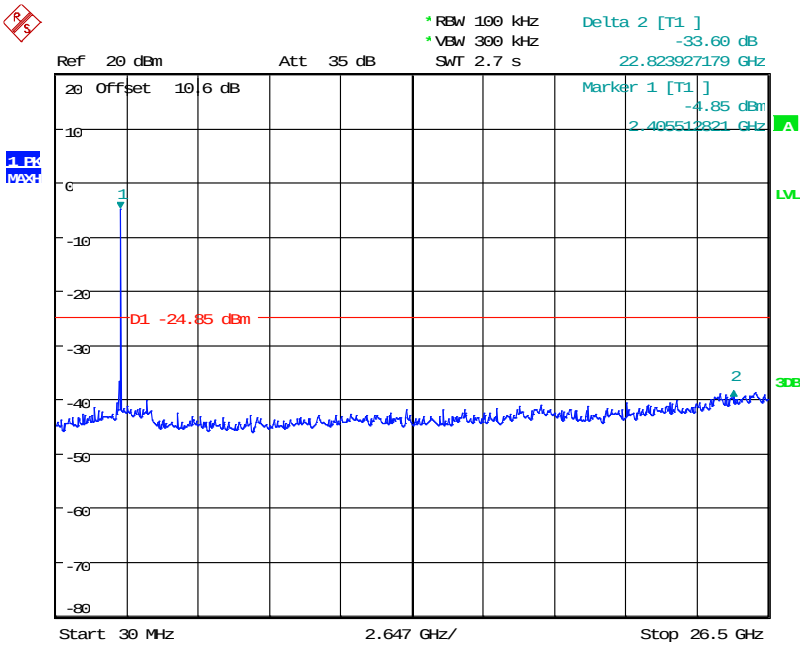
Date: 27.MAR.2018 16:03:28

B Mode High Channel



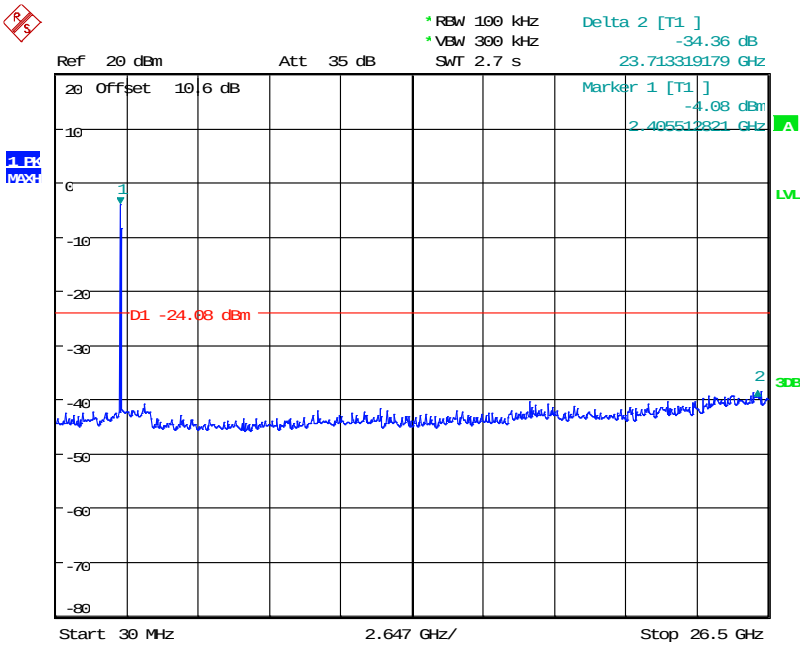
Date: 27.MAR.2018 16:05:28

G Mode Low Channel



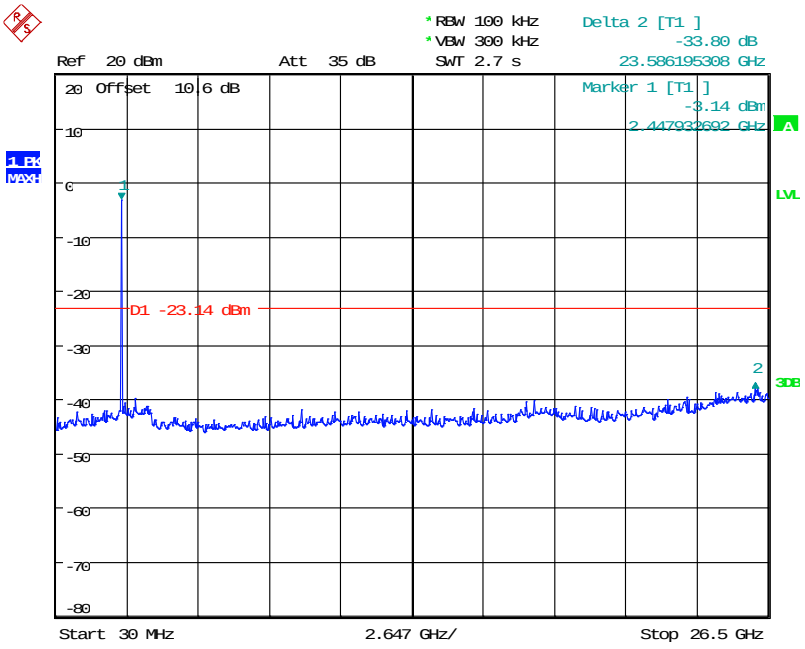
Date: 27.MAR.2018 16:16:19

G Mode Middle Channel



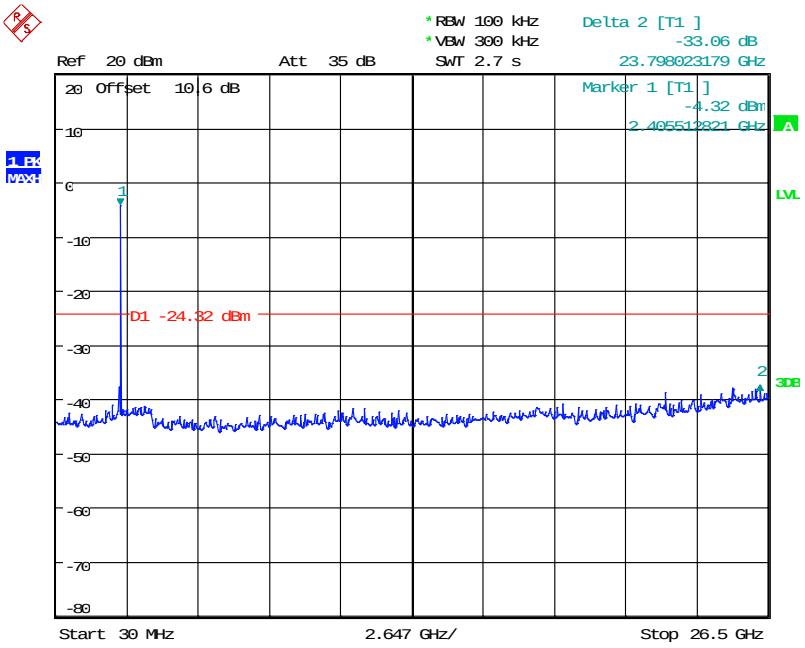
Date: 27.MAR.2018 16:18:00

G Mode High Channel



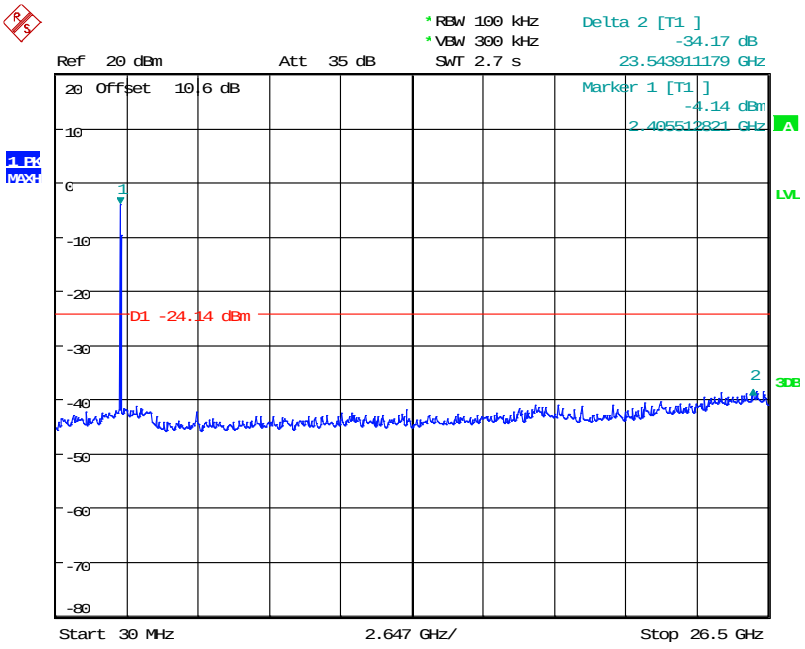
Date: 27.MAR.2018 16:20:01

N20 Mode Low Channel



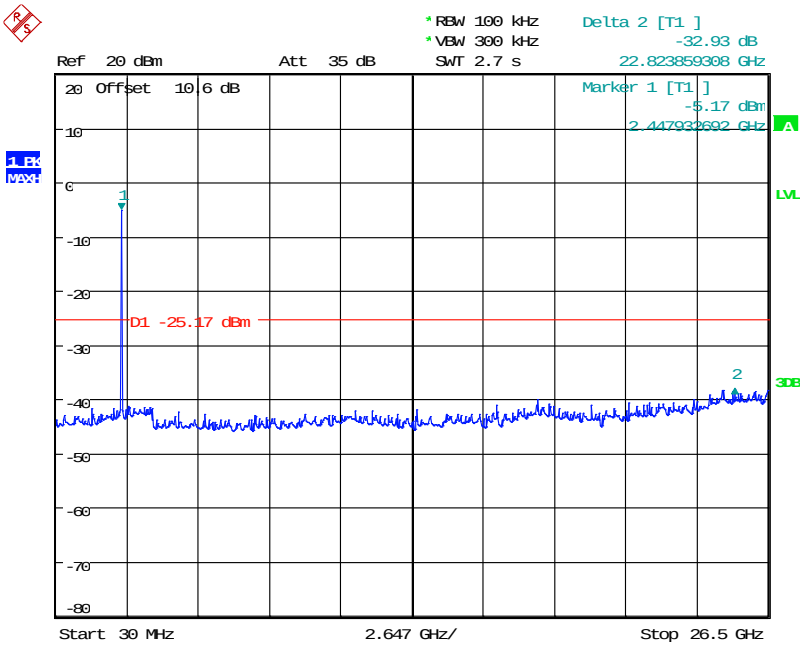
Date: 27.MAR.2018 16:26:30

N20 Mode Middle Channel



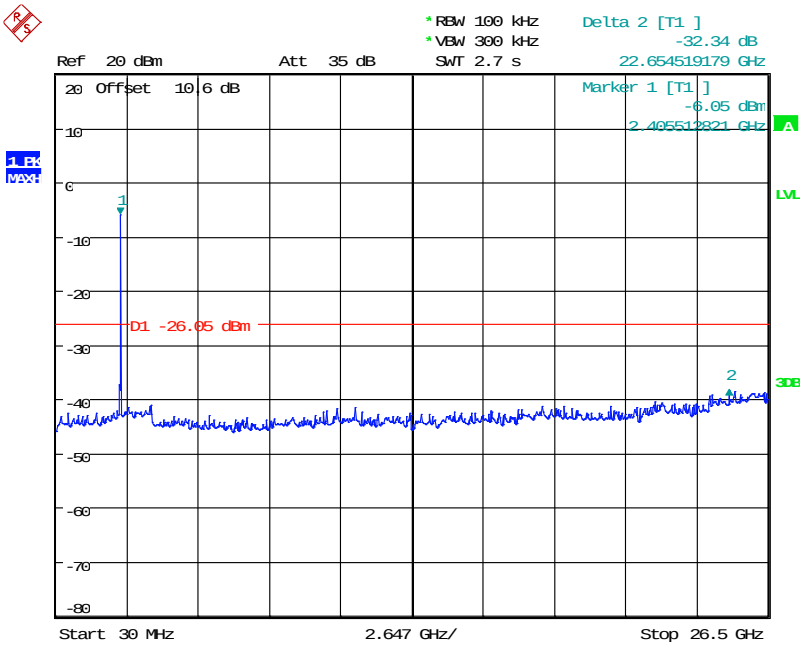
Date: 27.MAR.2018 16:27:50

N20 Mode High Channel



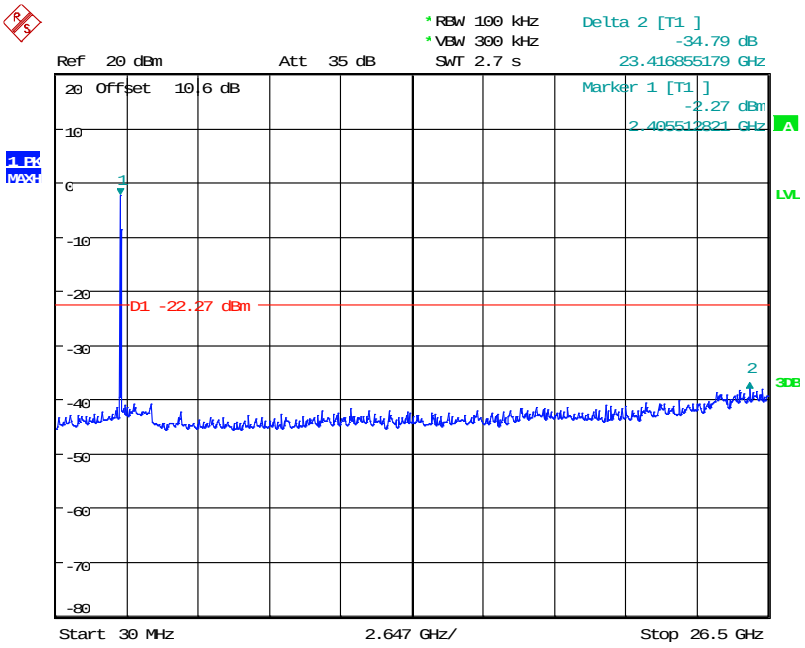
Date: 27.MAR.2018 16:29:23

N40 Mode Low Channel



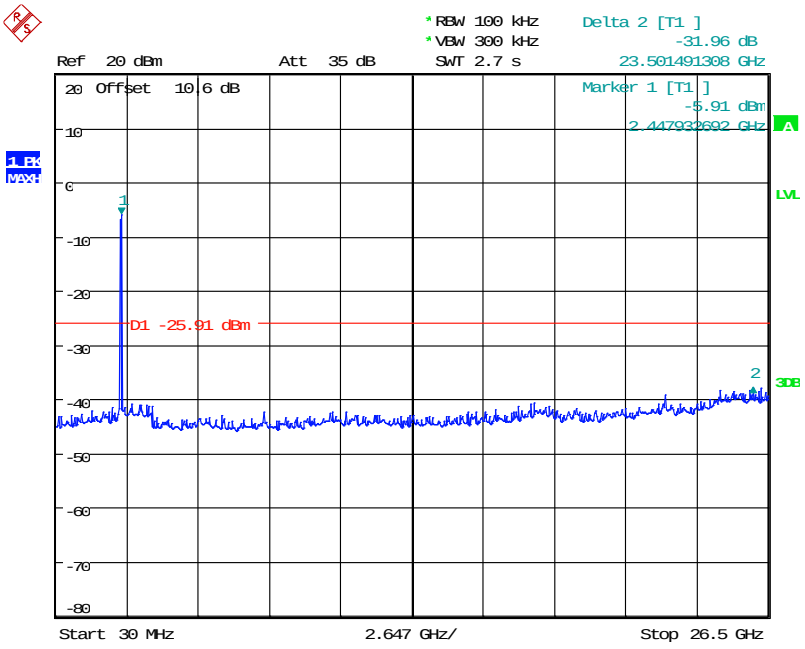
Date: 27.MAR.2018 16:48:02

N40 Mode Middle Channel



Date: 27.MAR.2018 16:49:39

N40 Mode High Channel



Date: 27.MAR.2018 16:51:21

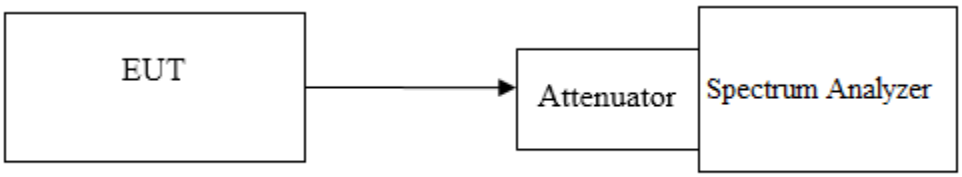
8 FCC §15.247(a)(2) – 6 dB Emission Bandwidth

8.1 Applicable Standard

According to FCC §15.247(a) (2).
Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

8.2 Test Procedure

According to ANSI C63.10-2013



6 dB Emission Bandwidth
The steps for the first option are as follows:
a) Set RBW = 100 kHz.
b) Set the VBW ≥ [3 × RBW].
c) Detector = peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

8.3 Test Equipment List and Details

Descriptions	Manufacturers	Models	Serial Numbers	Calibration Date	Calibration Due Date
Cable	WOKEN	SFL402	00100A1F6A192S	N.C.R	N.C.R
Spectrum Analyzer	Rohde & Schwarz	FSU26	200268	2017/05/08	2018/05/07
Attenuator	MINI-CIRCUITS	BW-S10W5+	N/A	2017/3/14	2018/3/13

***Statement of Traceability:** BACL Corp. attests that all of the calibrations on the equipment items listed above were traceable to the SI System of Units via the R.O.C. Center for Measurement Standards of the Electronics Testing Center, Taiwan (ETC) or to another internationally recognized National Metrology Institute (NMI), and were compliant with the current Taiwan Accreditation Foundation (TAF) requirements.*

8.4 Test Environmental Conditions

Temperature:	26° C
Relative Humidity:	58 %
ATM Pressure:	1010 hPa

The testing was performed by Tom Hsu on 2018-03-29

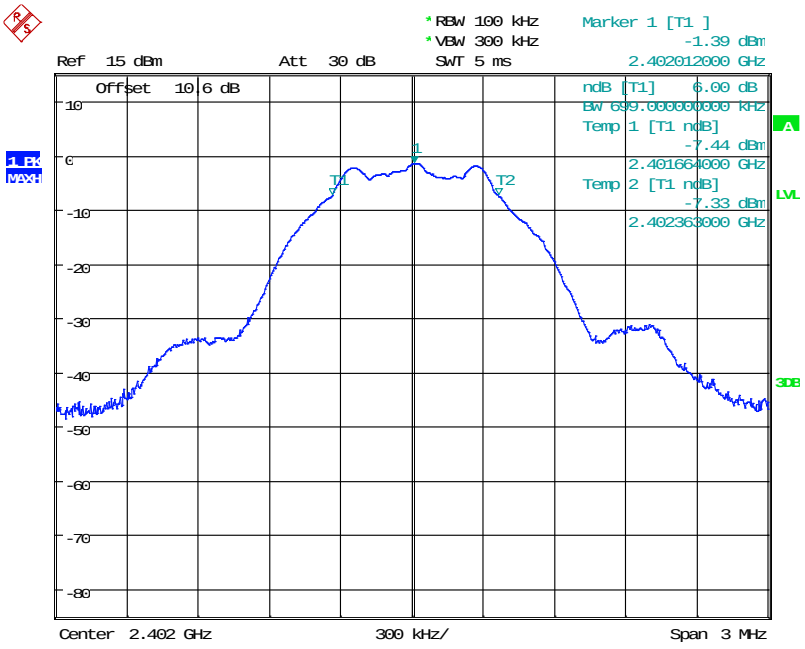
8.5 Test Results

Please refer to the following plots

Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	Limit (kHz)	Result
BLE Mode				
Low	2402	0.70	>500	PASS
Mid	2440	0.69	>500	PASS
High	2480	0.70	>500	PASS
B Mode				
Low	2412	10.05	>500	PASS
Mid	2437	10.05	>500	PASS
High	2462	10.05	>500	PASS
G Mode				
Low	2412	15.17	>500	PASS
Mid	2437	14.72	>500	PASS
High	2462	15.74	>500	PASS
N20 Mode				
Low	2412	15.12	>500	PASS
Mid	2437	17.08	>500	PASS
High	2462	14.78	>500	PASS
N40 Mode				
Low	2422	35.07	>500	PASS
Mid	2437	35.12	>500	PASS
High	2452	35.07	>500	PASS

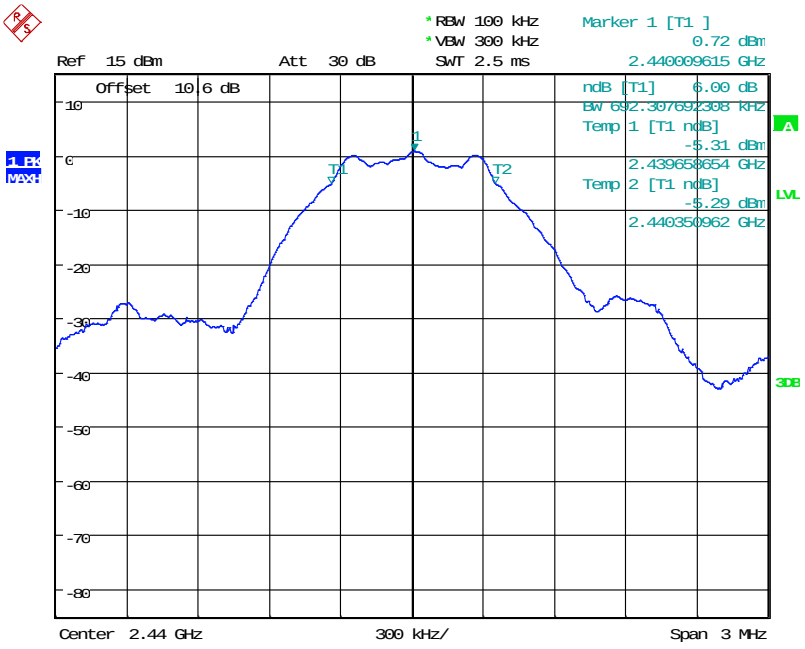
6 dB Emission Bandwidth

BLE Mode Low Channel



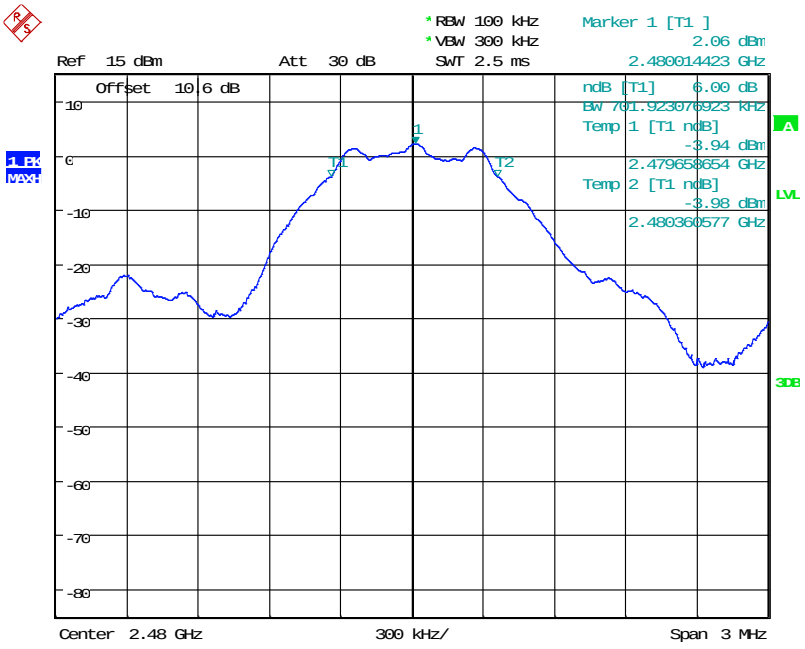
Date: 29.MAR.2018 11:31:11

BLE Mode Middle Channel



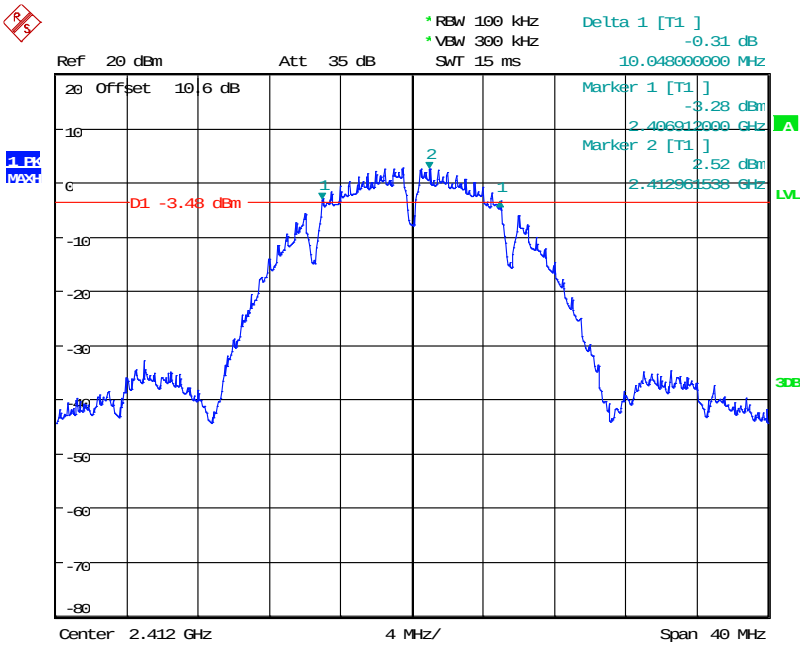
Date: 29.MAR.2018 11:15:45

BLE Mode High Channel



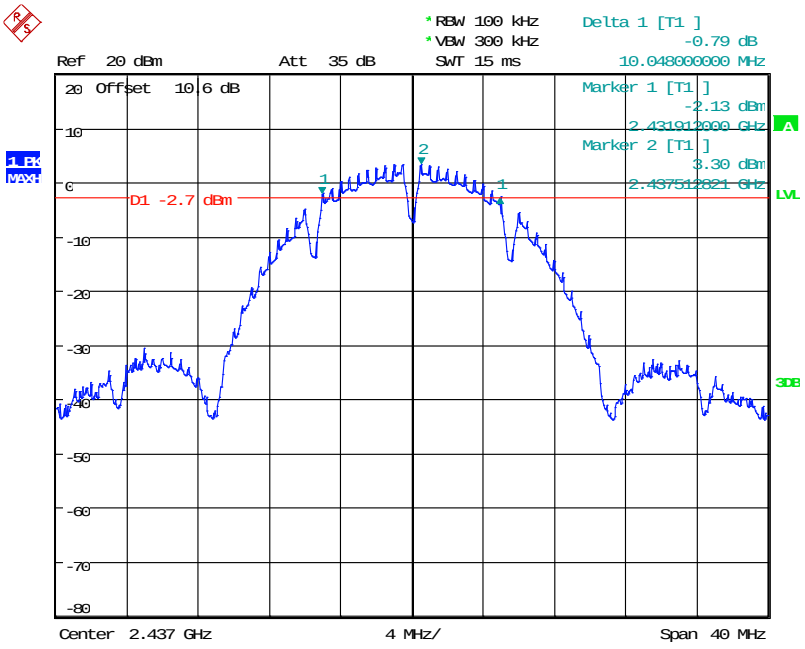
Date: 29.MAR.2018 11:17:38

B Mode Low Channel



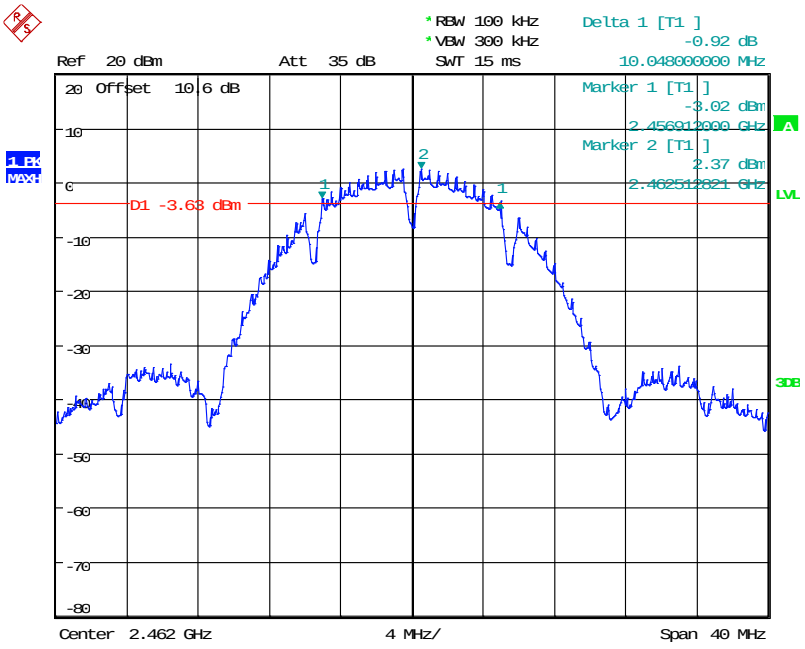
Date: 27.MAR.2018 16:01:20

B Mode Middle Channel



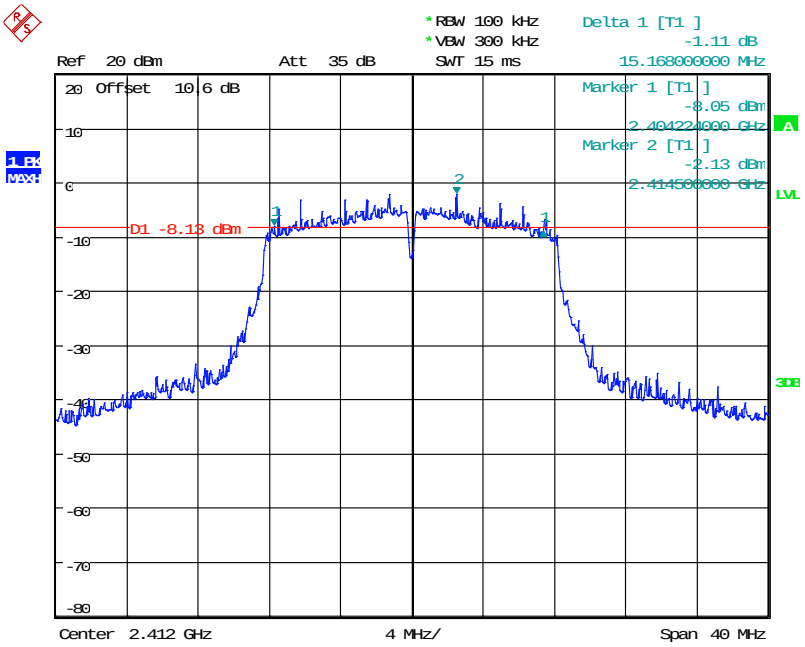
Date: 27.MAR.2018 16:02:55

B Mode High Channel



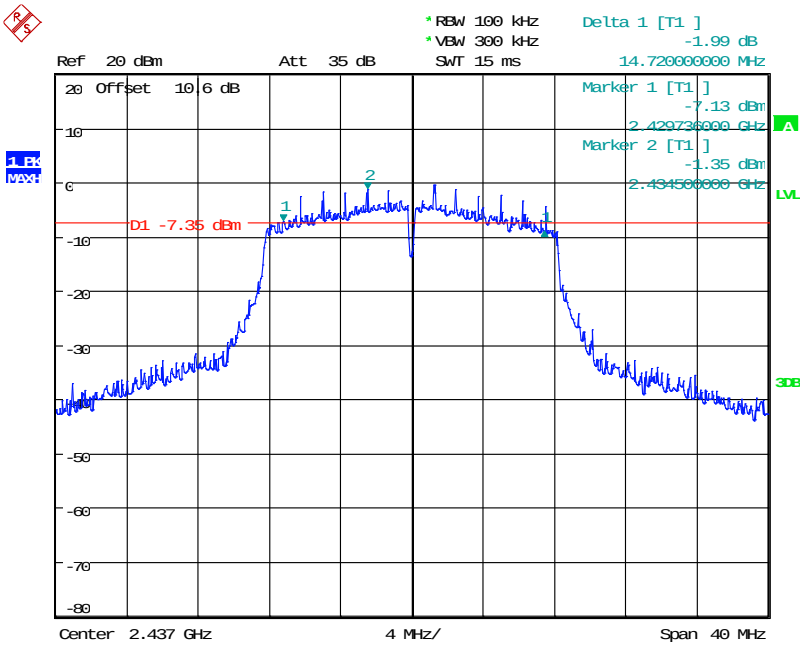
Date: 27.MAR.2018 16:04:44

G Mode Low Channel



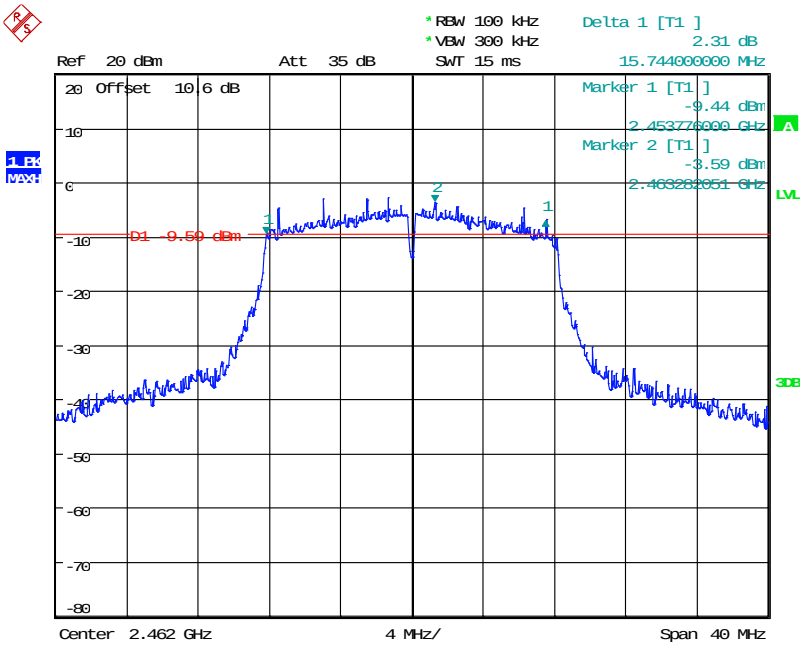
Date: 27.MAR.2018 16:15:45

G Mode Middle Channel



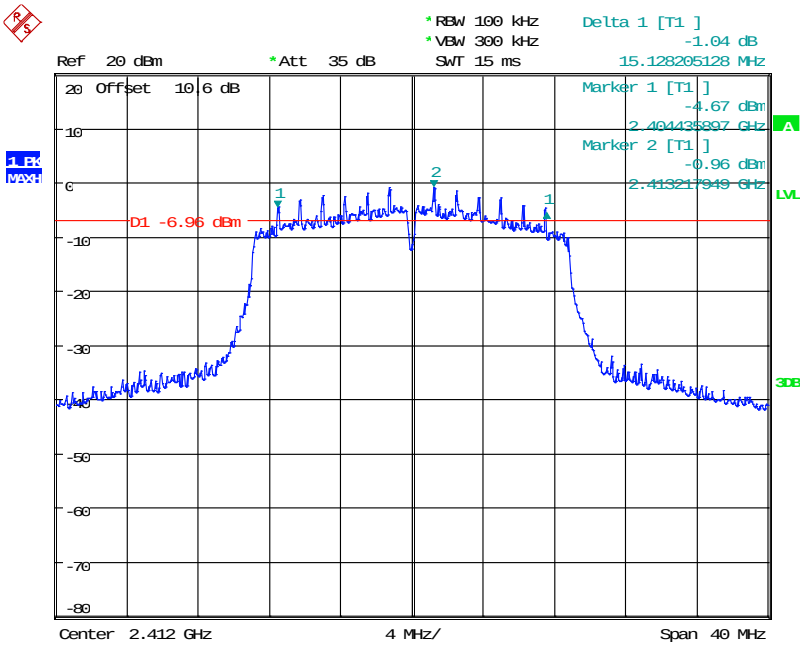
Date: 27.MAR.2018 16:17:26

G Mode High Channel



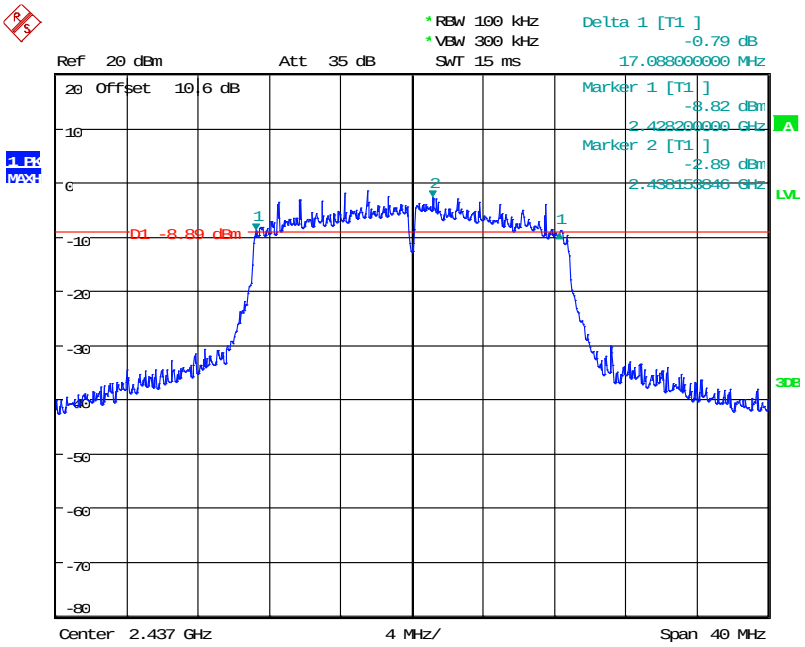
Date: 27.MAR.2018 16:19:20

N20 Mode Low Channel



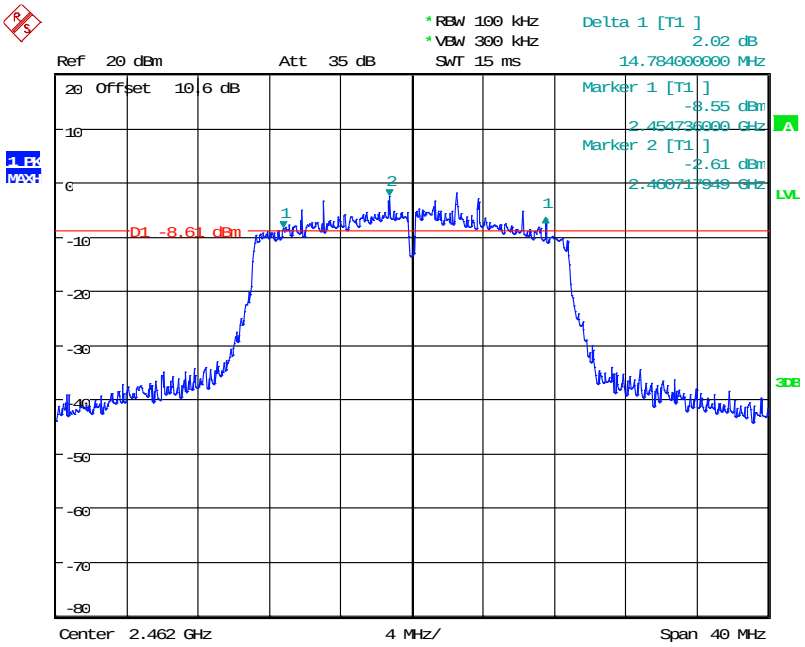
Date: 27.MAR.2018 16:37:20

N20 Mode Middle Channel



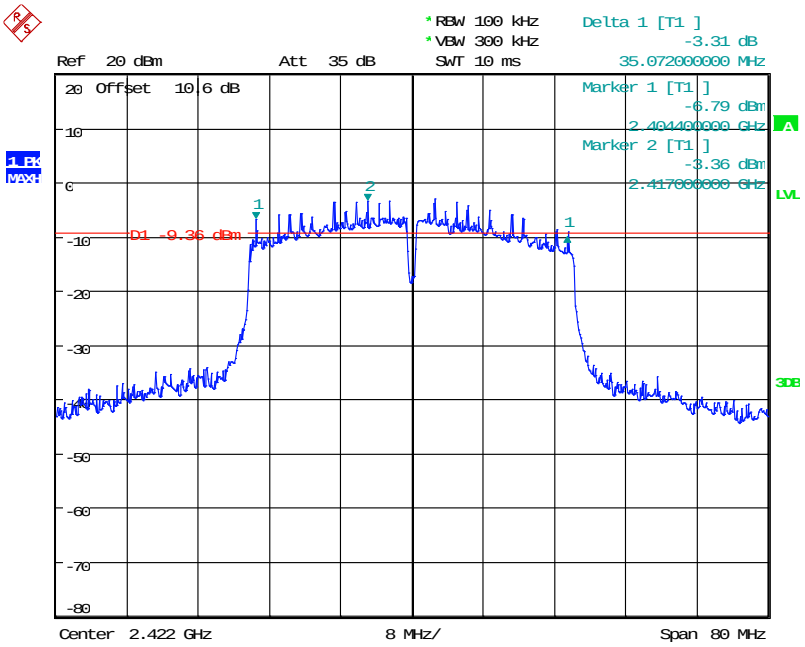
Date: 27.MAR.2018 16:27:17

N20 Mode High Channel



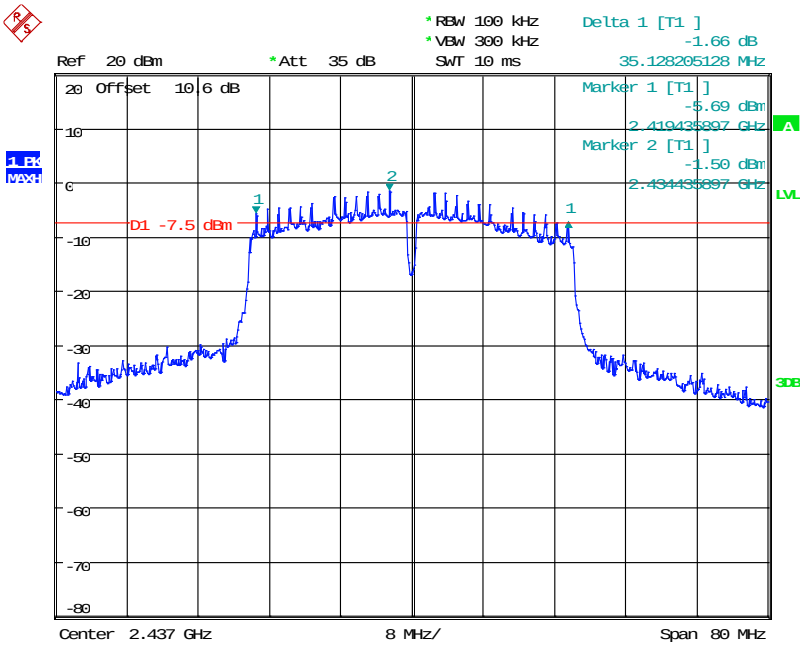
Date: 27.MAR.2018 16:28:41

N40 Mode Low Channel



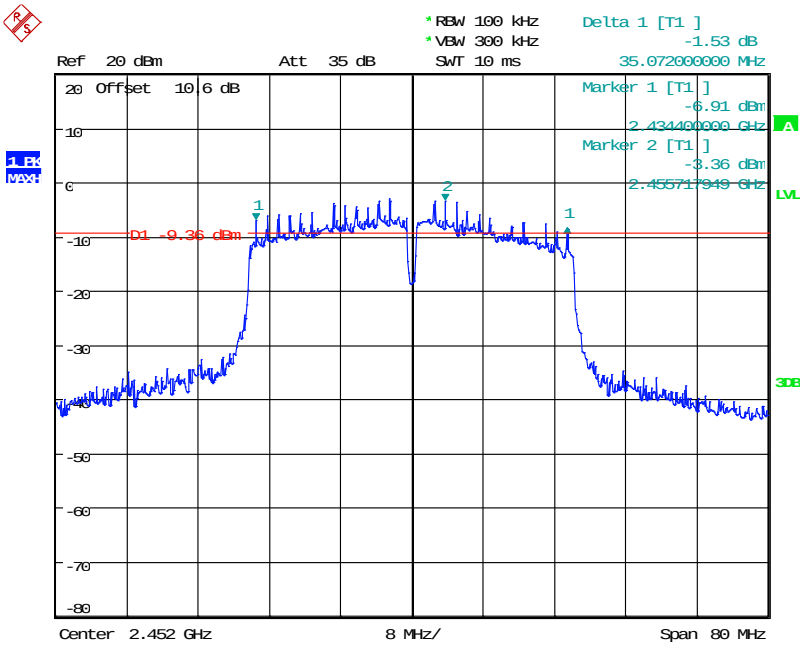
Date: 27.MAR.2018 16:47:27

N40 Mode Middle Channel



Date: 27.MAR.2018 16:57:11

N40 Mode High Channel



Date: 27.MAR.2018 16:50:38

9 FCC §15.247(b)(3) – Maximum Output Power

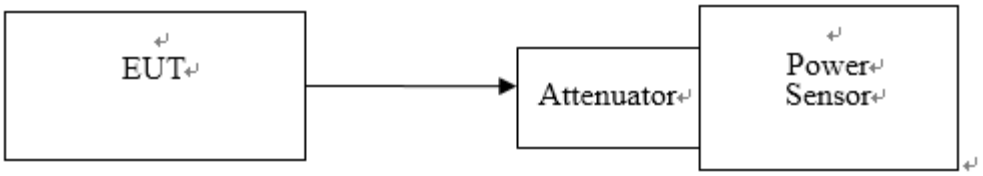
9.1 Applicable Standard

According to FCC §15.247(b) (3).

Systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

9.2 Test Procedure

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an Power sence.
3. Add a correction factor to the display.



9.3 Test Equipment List and Details

Descriptions	Manufacturers	Models	Serial Numbers	Calibration Date	Calibration Due Date
Cable	WOKEN	SFL402	S02-160323-07	2018/02/12	2019/02/11
Power Sensor	KEYSIGHT	U2021XA	MY54080018	2018/03/07	2019/03/06
Attenuator	MINI-CIRCUITS	BW-S10W5+	N/A	2017/12/14	2018/12/13

***Statement of Traceability:** BACL Corp. attests that all of the calibrations on the equipment items listed above were traceable to the SI System of Units via the R.O.C. Center for Measurement Standards of the Electronics Testing Center, Taiwan (ETC) or to another internationally recognized National Metrology Institute (NMI), and were compliant with the current Taiwan Accreditation Foundation (TAF) requirements.*

9.4 Test Environmental Conditions

Temperature:	26° C
Relative Humidity:	58 %
ATM Pressure:	1010 hPa

The testing was performed by Tom Hsu on 2018-03-29.

9.5 Test Results

Channel	Frequency (MHz)	Maximum peak Conducted Output Power (dBm)	Maximum peak Conducted Output Power (W)	Limit (W)	Result
BLE Mode					
Low	2402	0.66	0.0012	1	Compliance
Middle	2440	1.91	0.0016	1	Compliance
High	2480	2.77	0.0019	1	Compliance
B Mode					
Low	2412	15.81	0.0381	1	Compliance
Middle	2437	15.86	0.0385	1	Compliance
High	2462	14.79	0.0301	1	Compliance
G Mode					
Low	2412	18.51	0.0710	1	Compliance
Middle	2437	18.92	0.0780	1	Compliance
High	2462	18.32	0.0679	1	Compliance
N20 Mode					
Low	2412	18.41	0.0693	1	Compliance
Middle	2437	18.98	0.0791	1	Compliance
High	2462	18.21	0.0662	1	Compliance
N40 Mode					
Low	2422	18.91	0.0778	1	Compliance
Middle	2437	19.27	0.0845	1	Compliance
High	2452	18.77	0.0753	1	Compliance

Channel	Frequency	Conducted Average Output Power	Duty factor	Total Conducted Average Output Power		Limit	Result
	(MHz)	(dBm)	(dB)	(dBm)	(W)	(W)	
BLE Mode							
Low	2402	-3.62	2.37	-1.25	0.0007	1	PASS
Mid	2440	-1.42	2.37	0.95	0.0012	1	PASS
High	2480	-0.05	2.37	2.32	0.0017	1	PASS
B Mode							
Low	2412	13.59	0.09	13.68	0.0233	1	PASS
Mid	2437	13.64	0.09	13.73	0.0236	1	PASS
High	2462	12.74	0.09	12.83	0.0192	1	PASS
G Mode							
Low	2412	8.63	0.51	9.14	0.0082	1	PASS
Mid	2437	9.57	0.51	10.08	0.0102	1	PASS
High	2462	8.6	0.51	9.11	0.0081	1	PASS
N20 Mode							
Low	2412	8.48	0.51	8.99	0.0079	1	PASS
Mid	2437	9.4	0.51	9.91	0.0098	1	PASS
High	2462	8.42	0.51	8.93	0.0078	1	PASS
N40 Mode							
Low	2422	9.04	0.81	9.85	0.0097	1	PASS
Mid	2437	9.94	0.81	10.75	0.0119	1	PASS
High	2452	8.98	0.81	9.79	0.0095	1	PASS

10 FCC §15.247(d) – 100 kHz Bandwidth of Frequency Band Edge

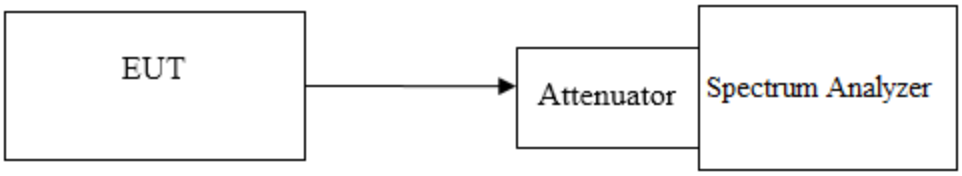
10.1 Applicable Standard

According to 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)).

10.2 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.



10.3 Test Equipment List and Details

Descriptions	Manufacturers	Models	Serial Numbers	Calibration Date	Calibration Due Date
Spectrum Analyzer	Rohde & Schwarz	FSU26	200268	2017/05/08	2018/05/07
Cable	WOKEN	SFL402	S02-160323-07	2018/02/12	2019/02/11
Attenuator	MINI-CIRCUITS	BW-S10W5+	N/A	2017/12/14	2018/12/13

***Statement of Traceability:** BACL Corp. attests that all of the calibrations on the equipment items listed above were traceable to the SI System of Units via the R.O.C. Center for Measurement Standards of the Electronics Testing Center, Taiwan (ETC) or to another internationally recognized National Metrology Institute (NMI), and were compliant with the current Taiwan Accreditation Foundation (TAF) requirements*

10.4 Test Environmental Conditions

Temperature:	25° C
Relative Humidity:	56 %
ATM Pressure:	1010 hPa

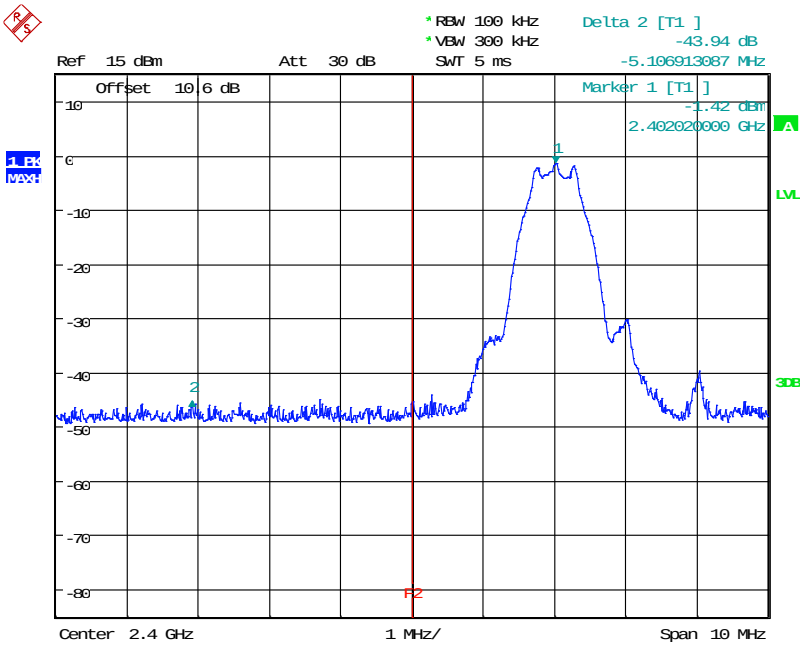
The testing was performed by Tom Hsu on 2018-03-29

10.5 Test Results

Please refer to the following plots

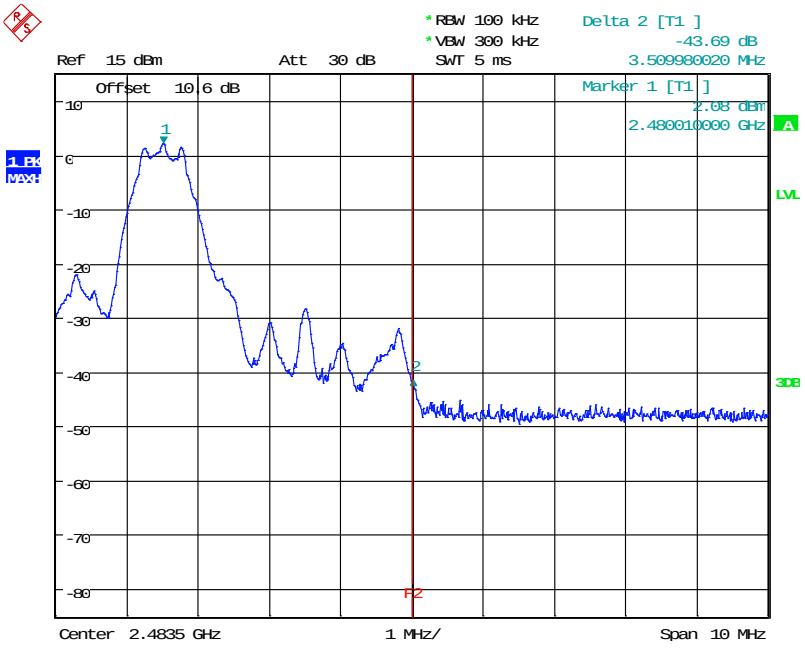
Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
BLE Mode				
Low	2402	43.94	≥ 20	PASS
High	2480	43.69	≥ 20	PASS
B Mode				
Low	2412	36.22	≥ 20	PASS
High	2462	43.11	≥ 20	PASS
G Mode				
Low	2412	33.20	≥ 20	PASS
High	2462	37.82	≥ 20	PASS
N20 Mode				
Low	2412	33.14	≥ 20	PASS
High	2462	38.62	≥ 20	PASS
N40 Mode				
Low	2422	29.89	≥ 20	PASS
High	2452	35.46	≥ 20	PASS

Band Edge, Left Side (BLE mode / CH Low)



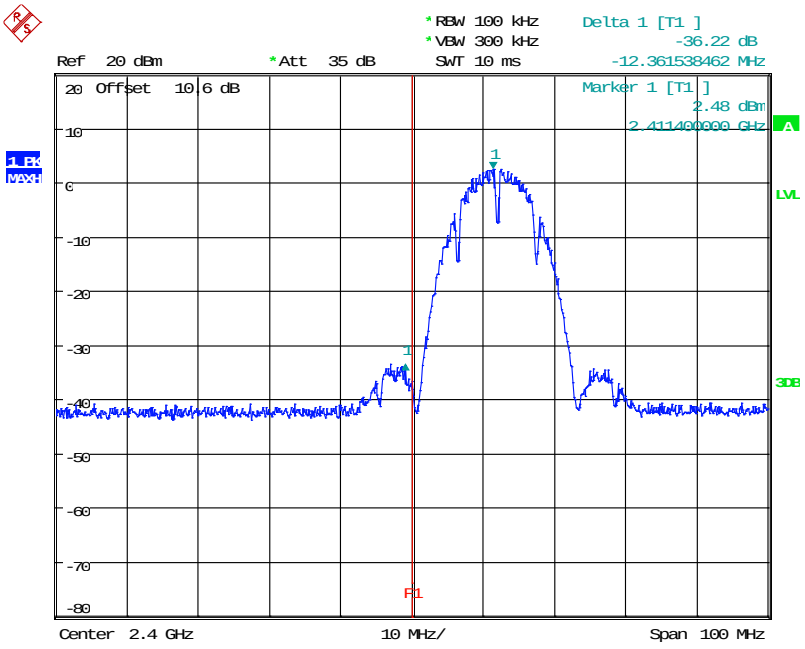
Date: 29.MAR.2018 11:13:30

Band Edge, Right Side (BLE mode / CH High)



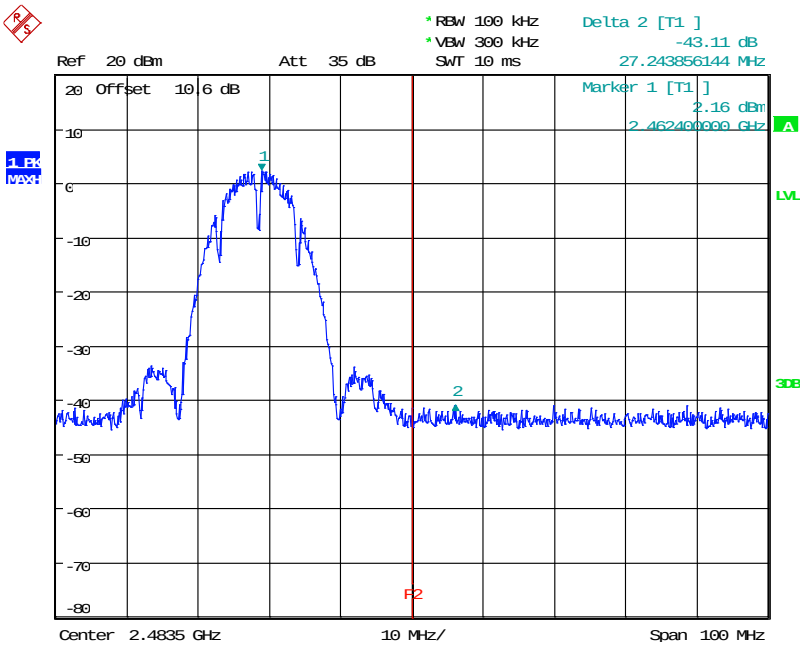
Date: 29.MAR.2018 11:18:35

Band Edge, Left Side (B mode / CH Low)



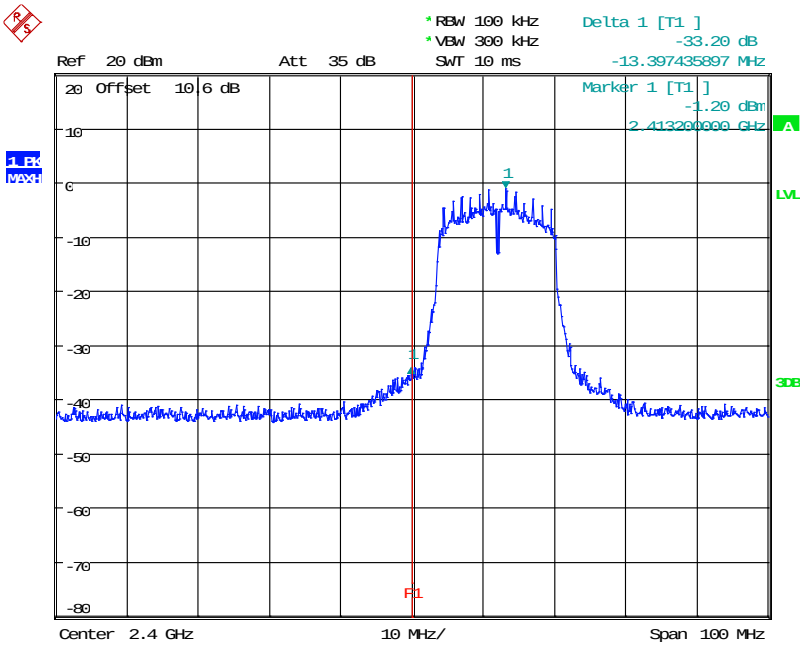
Date: 27.MAR.2018 16:10:38

Band Edge, Right Side (B mode / CH High)



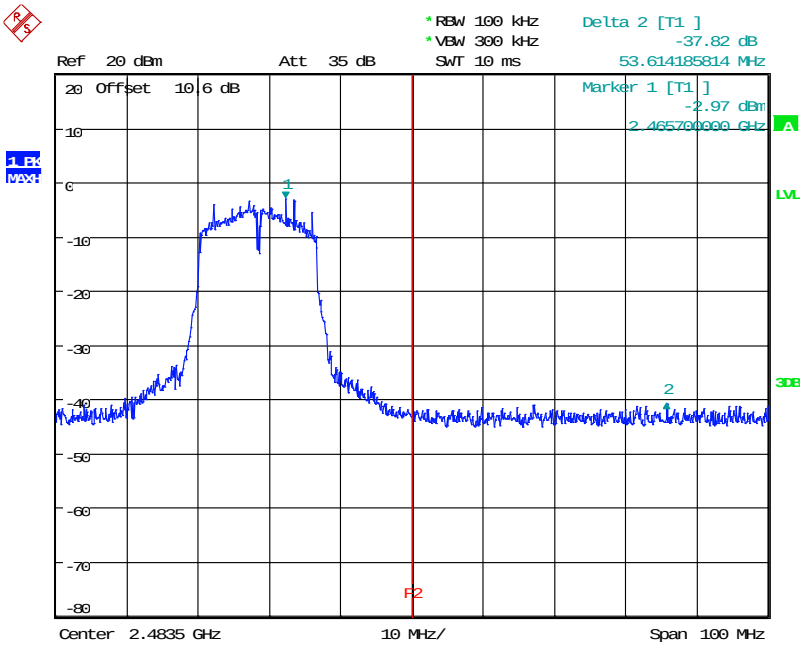
Date: 27.MAR.2018 16:05:14

Band Edge, Left Side (G mode / CH Low)



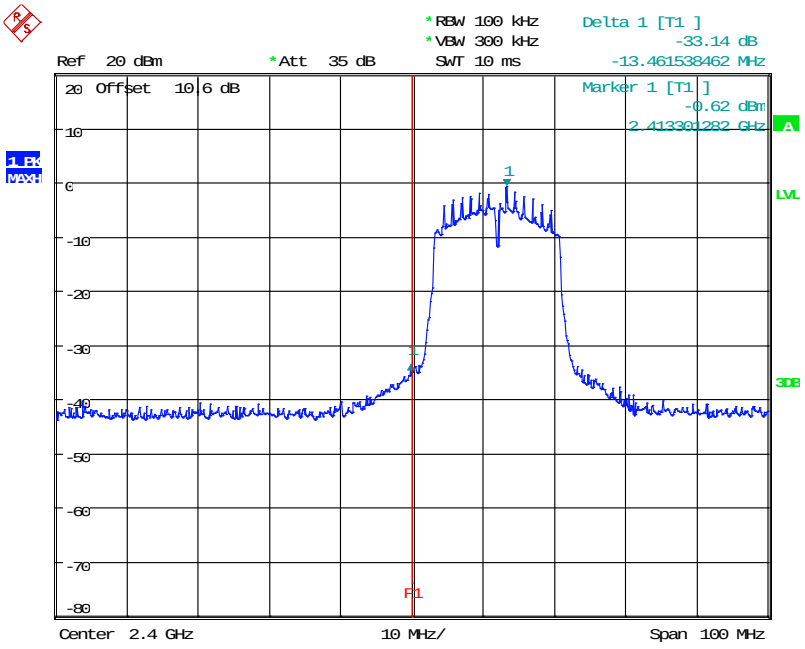
Date: 27.MAR.2018 16:23:22

Band Edge, Right Side (G mode / CH High)



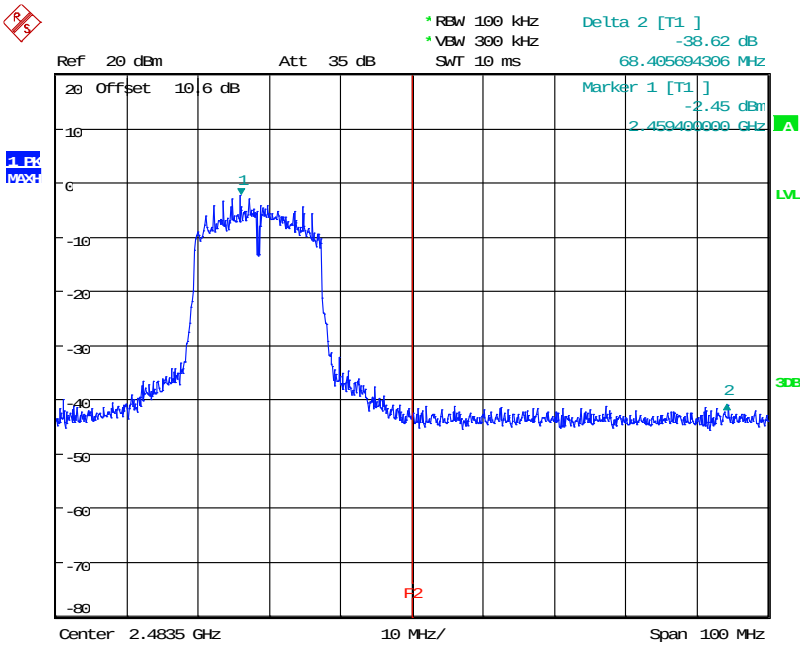
Date: 27.MAR.2018 16:19:49

Band Edge, Left Side (N20 mode / CH Low)



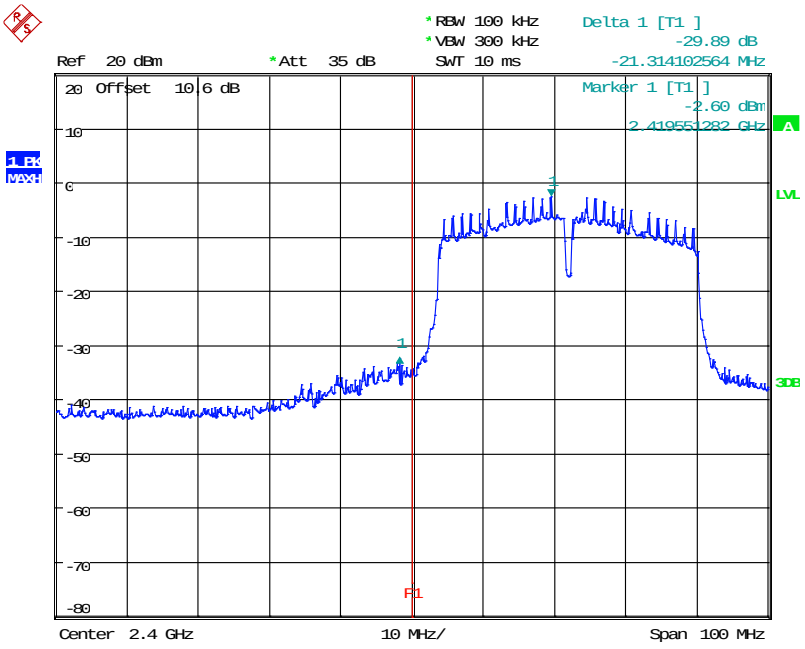
Date: 27.MAR.2018 16:41:32

Band Edge, Right Side (N20 mode / CH High)



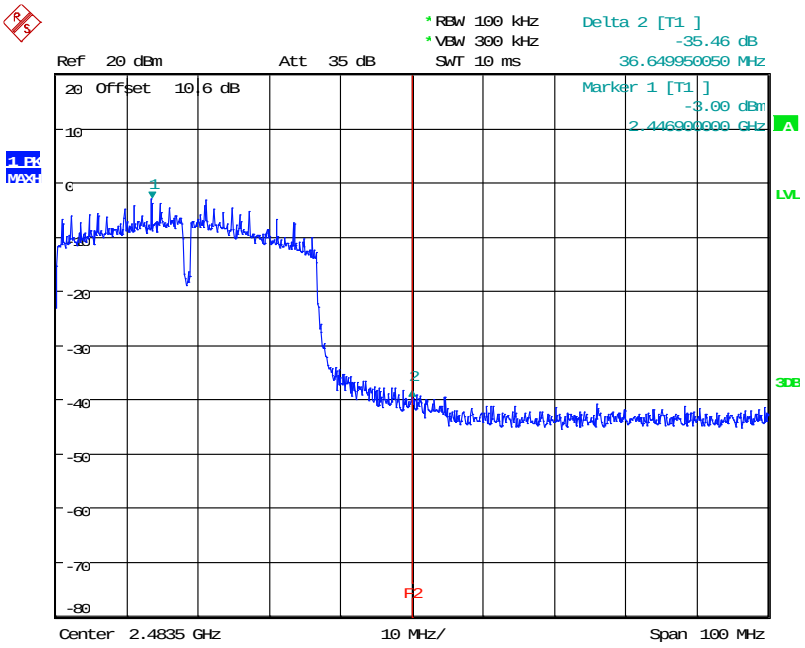
Date: 27.MAR.2018 16:29:11

Band Edge, Left Side (N40 mode / CH Low)



Date: 27.MAR.2018 17:01:03

Band Edge, Right Side (N40 mode / CH High)



Date: 27.MAR.2018 16:51:08

11 FCC §15.247(e) – Power Spectral Density

11.1 Applicable Standard

According to FCC §15.247(e).

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

11.2 Test Procedure

According to ANSI C63.10-2013

a) Set analyzer center frequency to DTS channel center frequency.

b) Set the span to 1.5 times the DTS bandwidth.

c) Set the RBW to 3 kHz ≤ RBW ≤ 100 kHz.

d) Set the VBW ≥ [3 × RBW].

e) Detector = peak.

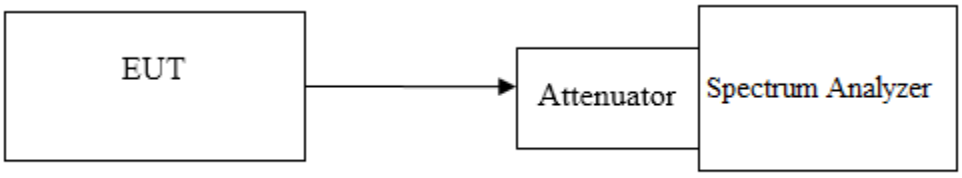
f) Sweep time = auto couple.

g) Trace mode = max hold.

h) Allow trace to fully stabilize.

i) Use the peak marker function to determine the maximum amplitude level within the RBW.

j) If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat



11.3 Test Equipment List and Details

Descriptions	Manufacturers	Models	Serial Numbers	Calibration Date	Calibration Due Date
Spectrum Analyzer	Rohde & Schwarz	FSU26	200268	2017/05/08	2018/05/07
Cable	WOKEN	SFL402	S02-160323-07	2018/02/12	2019/02/11
Attenuator	MINI-CIRCUITS	BW-S10W5+	N/A	2017/12/14	2018/12/13

***Statement of Traceability:** BACL Corp. attests that all of the calibrations on the equipment items listed above were traceable to the SI System of Units via the R.O.C. Center for Measurement Standards of the Electronics Testing Center, Taiwan (ETC) or to another internationally recognized National Metrology Institute (NMI), and were compliant with the current Taiwan Accreditation Foundation (TAF) requirements*

11.4 Test Environmental Conditions

Temperature:	24° C
Relative Humidity:	58 %
ATM Pressure:	1010 hPa

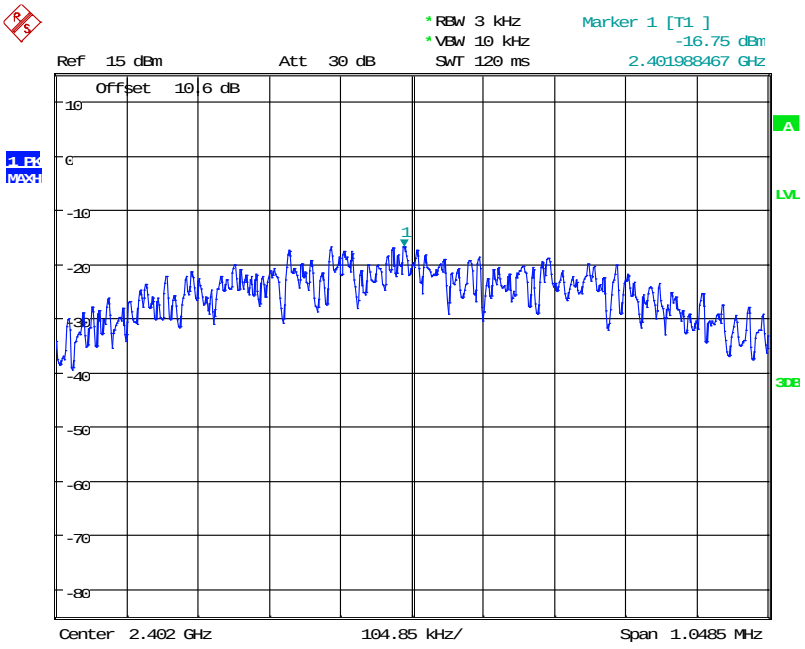
The testing was performed by Tom Hsu on 208-03-29.

11.5 Test Results

Please refer to the following plots

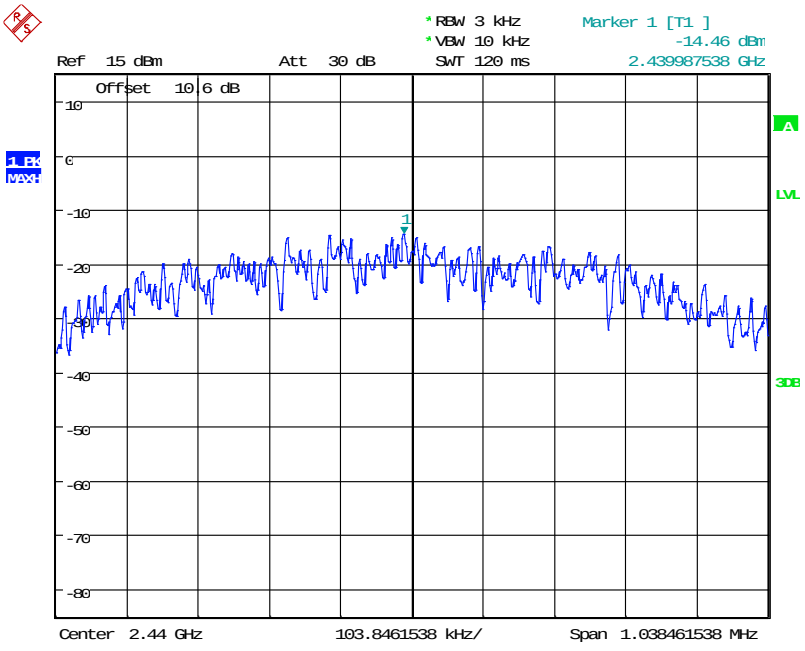
Channel	Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
BLE Mode				
Low	2402	-16.75	8	PASS
Mid	2440	-14.46	8	PASS
High	2480	-13.25	8	PASS
B Mode				
Low	2412	-12.82	8	PASS
Mid	2437	-7.86	8	PASS
High	2462	-13.72	8	PASS
G Mode				
Low	2412	-17.97	8	PASS
Mid	2437	-17.66	8	PASS
High	2462	-17.98	8	PASS
N20 Mode				
Low	2412	-17.43	8	PASS
Mid	2437	-17.00	8	PASS
High	2462	-18.25	8	PASS
N40 Mode				
Low	2422	-18.27	8	PASS
Mid	2437	-17.78	8	PASS
High	2452	-18.59	8	PASS

BLE Mode PPSD, Low Channel



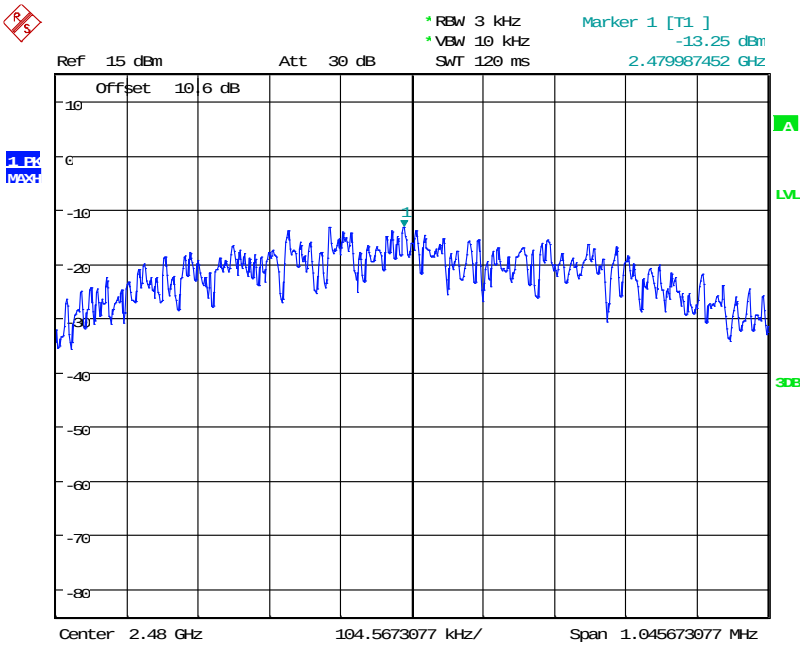
Date: 29.MAR.2018 11:32:50

BLE Mode PPSD, Middle Channel



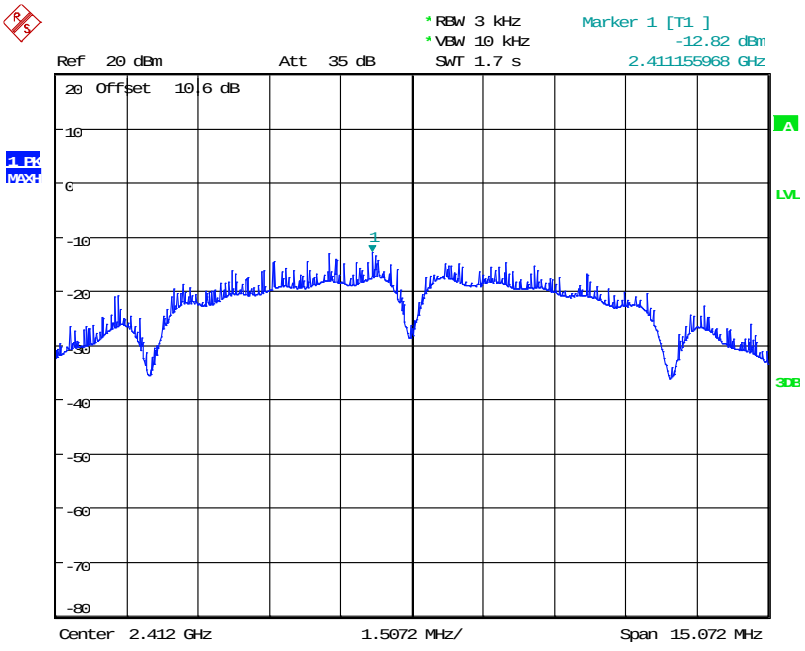
Date: 29.MAR.2018 11:16:08

BLE Mode PPSD, High Channel



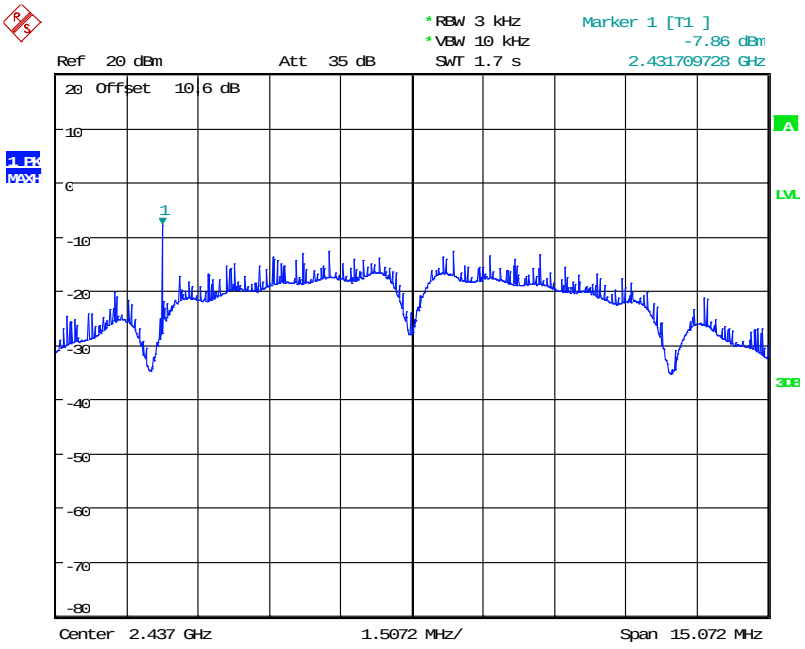
Date: 29.MAR.2018 11:18:03

B Mode PPSD, Low Channel



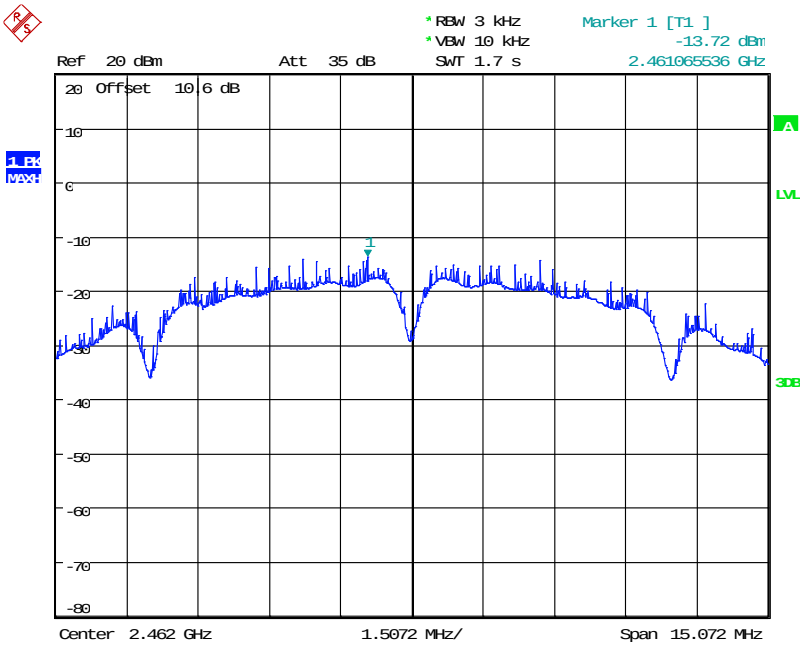
Date: 27.MAR.2018 16:01:32

B Mode PPSD, Middle Channel



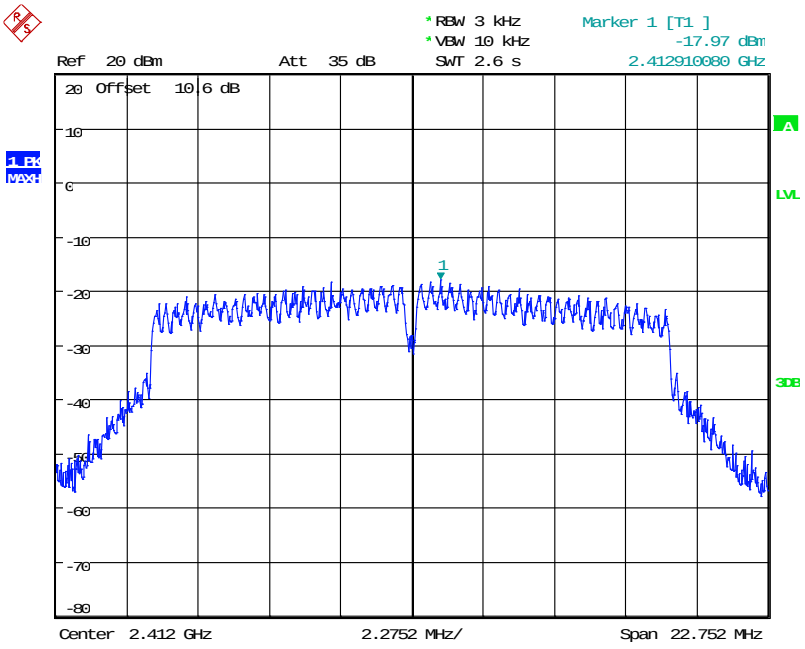
Date: 27.MAR.2018 16:03:10

B Mode PPSD, High Channel



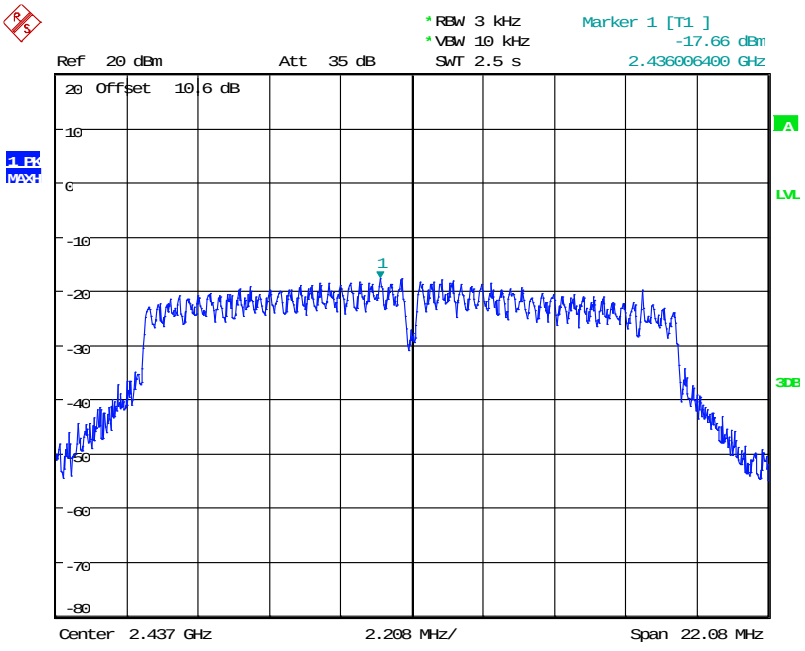
Date: 27.MAR.2018 16:05:00

G Mode PPSD, Low Channel



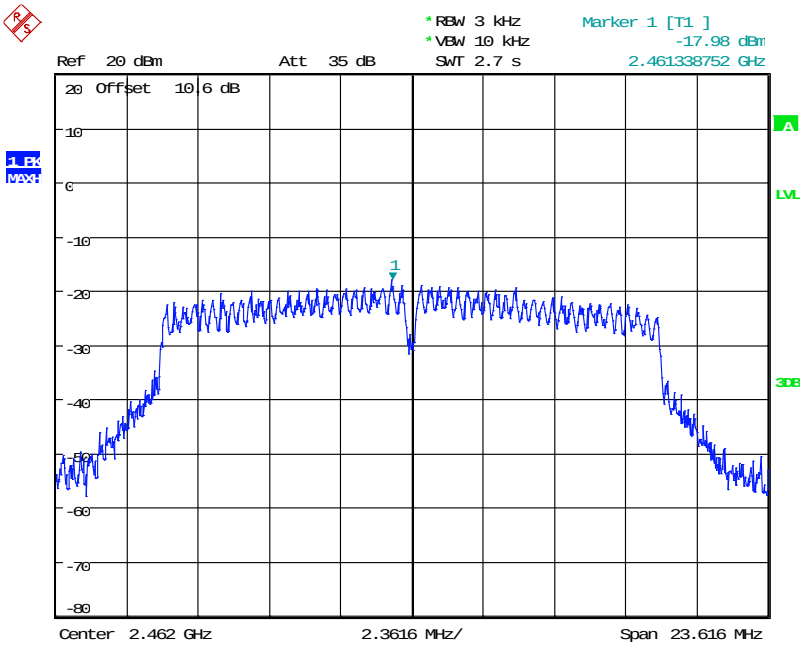
Date: 27.MAR.2018 16:15:56

G Mode PPSD, Middle Channel



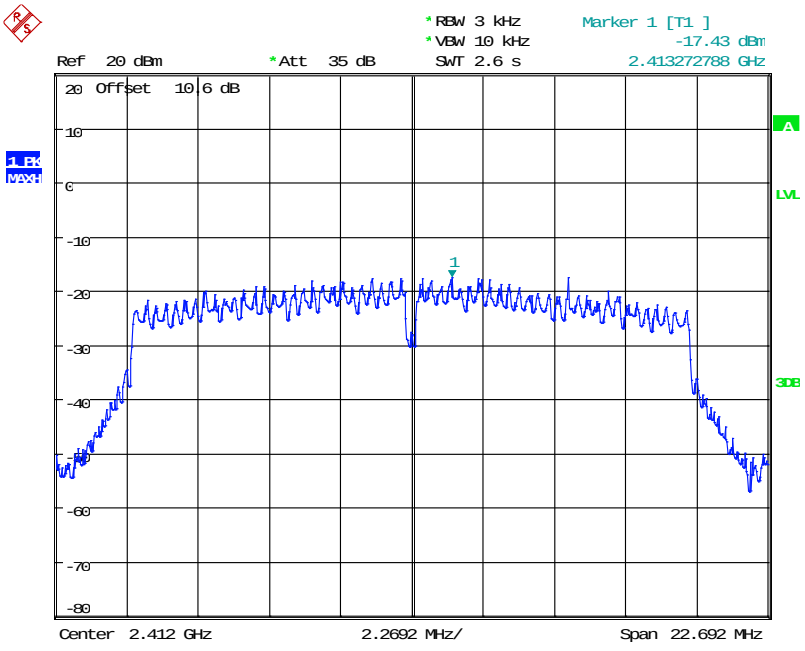
Date: 27.MAR.2018 16:17:43

G Mode PPSD, High Channel



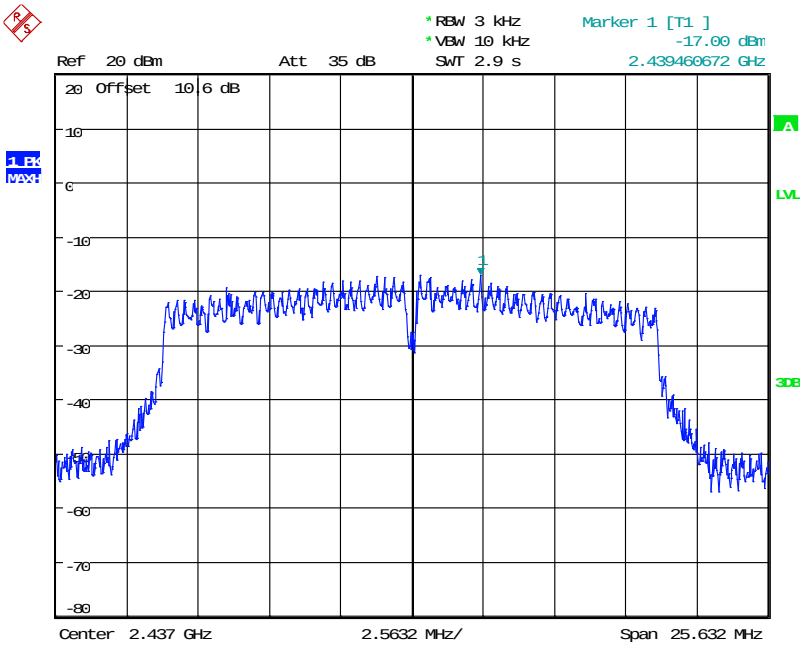
Date: 27.MAR.2018 16:19:35

N20 Mode PPSD, Low Channel



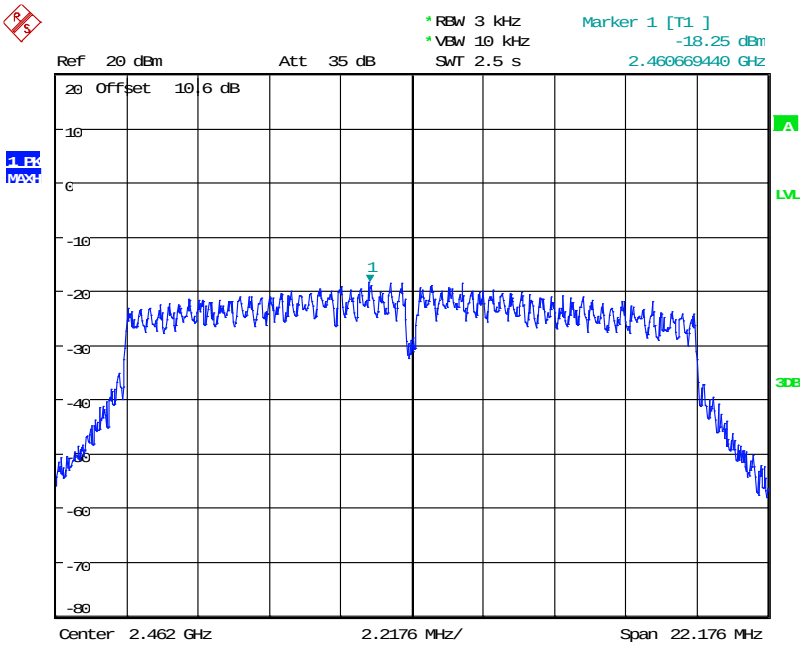
Date: 27.MAR.2018 16:40:10

N20 Mode PPSD, Middle Channel



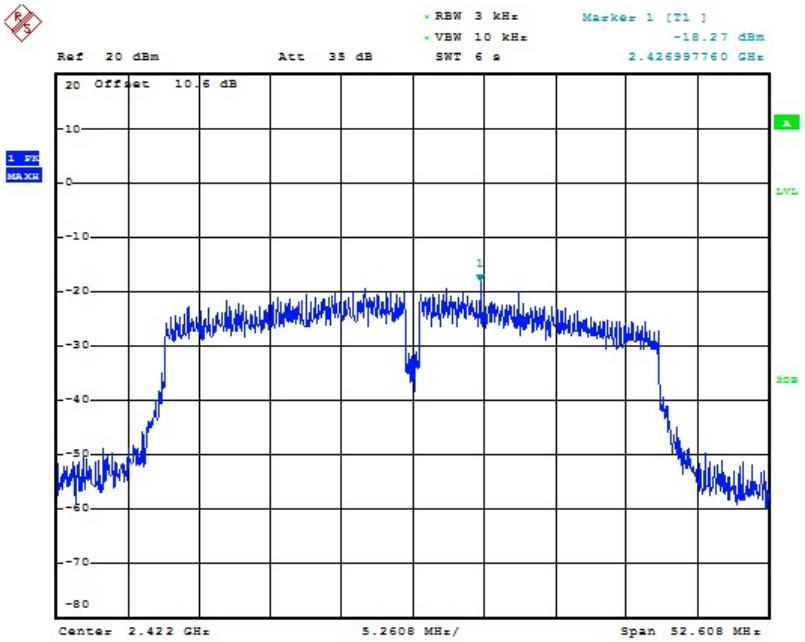
Date: 27.MAR.2018 16:27:33

N20 Mode PPSD, High Channel



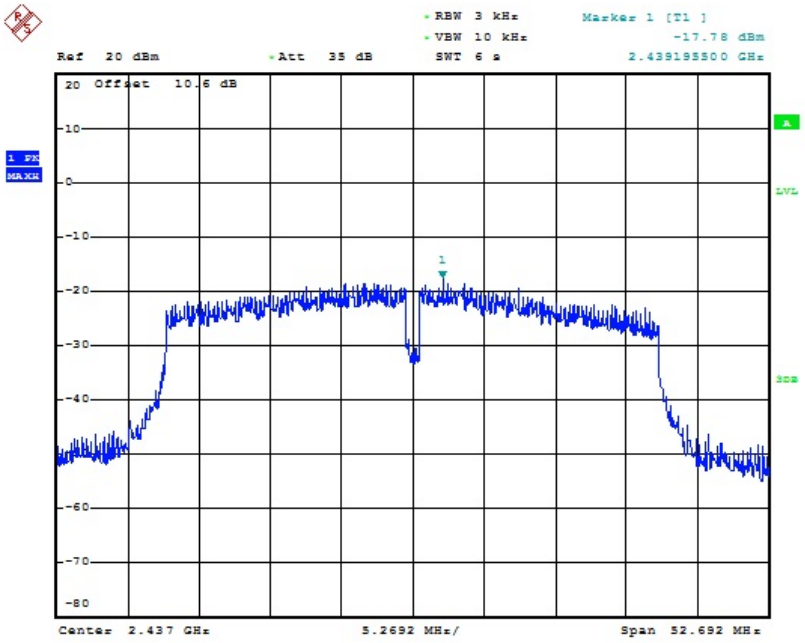
Date: 27.MAR.2018 16:28:57

N40 Mode PPSD, Low Channel



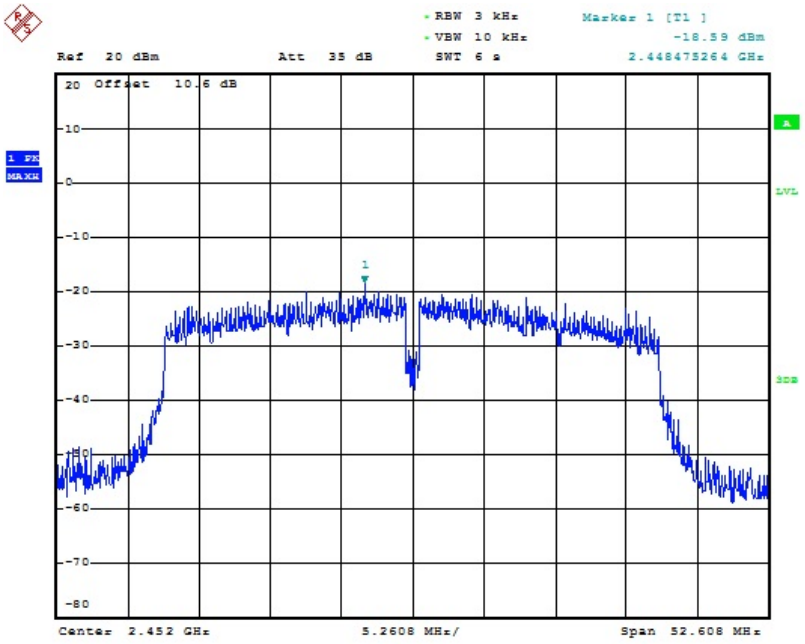
Date: 27.MAR.2018 16:47:39

N40 Mode PPSD, Middle Channel



Date: 27.MAR.2018 16:59:21

N40 Mode PPSD, High Channel



Date: 27.MAR.2018 16:50:55

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