FCC PART 15 SUBPART C TEST REPORT						
FCC PART 15.247						
Report Reference No FCC ID	TZ170100238-BLE 2ALGP-VJB-105					
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Testing Laboratory Name	Dongguan Dongdian Testing Servi	ce Co.,Ltd				
Address	No.17, Zongbu Road 2, Songshan Dongguan City, Guangdong Provin					
Applicant's name	Innovative Technology Electroni	ics LLC				
Address:	No.1 Channel Drive, Port Washing	ton, NY 11050, USA				
Test specification:						
Standard	FCC Part 15.247: Operation with 2400-2483.5 MHz and 5725-5850					
TRF Originator:	Shenzhen Tongzhou Testing Co.,Ltd					
Master TRF	Dated 2012-06					
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Test item description	Large Full Size Vinyl Turntable Juk	ebox				
Trade Mark:	Victoria					
Model/Type reference	VJB-105					
Listed Models	/					
Manufacturer	Innovative Technology Electroni	ics LLC				
Modulation Type	GFSK					
Operation Frequency	From 2402MHz to 2480MHz					
Rating	DC 18.0V Adapter from AC 100V~	240V-50/60Hz				
Result	PASS					

TEST REPORT

Test Report No. :		TZ170100238-BLE	2017/3/13 Date of issue		
Equipment under Test	:	Large Full Size Vinyl Turntabl	e Jukebox		
Model /Type	:	VJB-105			
Listed Models	:	1			
Applicant	:	Innovative Technology Elec	ctronics LLC		
Address	:	No.1 Channel Drive, Port Washington, NY 11050, USA			
Manufacturer	:	Jin shun yan Electronic processing factory			
Address	:	Xin xu Town,hui yang,Guangdong,China			

Test Result:	PASS
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The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. TEST STANDARDS

The tests were performed according to following standards:

<u>FCC Rules Part 15.247</u>: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz. <u>ANSI C63.10-2013</u>: American National Standard for Testing Unlicensed Wireless Devices

2. <u>SUMMARY</u>

2.1. General Remarks

Date of receipt of test sample	:	2017/1/18
Testing commenced on	:	2017/1/18
Testing concluded on	:	2017/3/13

2.2. Product Description

The **Innovative Technology Electronics LLC**'s Model: VJB-105 or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

Name of EUT	Large Full Size Vinyl Turntable Jukebox
Model/Type reference	VJB-105
Listed Models	/
FCC ID	2ALGP-VJB-105
Bluetooth	Supported BT 4.0+EDR
Antenna Type	Integral
Bluetooth FCC Operation frequency	2402MHz-2480MHz
Bluetooth Modulation	EDR(GFSK,8DPSK,π/4DQPSK)/BLE(GFSK)

2.3. Equipment Under Test

Power supply system utilised

Power supply voltage	:	0	120V / 60 Hz	0	115V / 60Hz
		Ο	12 V DC	0	24 V DC
			Other (specified in blank bel	ow)

DC 18.0V Adapter from AC 100V~240V-50/60Hz

2.4. Short description of the Equipment under Test (EUT)

2.4GHz (Large Full Size Vinyl Turntable Jukebox (M/N: VJB-105))

For more details, refer to the user's manual of the EUT.

2.5. EUT operation mode

The application provider specific test software (BlueTest) to control sample in continuous TX and RX (Duty Cycle >98%)

for testing meet KDB558074 test requirement.

The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continous transmitting and receiving mode for testing. There are 40 channels of EUT, and the test carried out at the lowest channel, middle channel and highest channel.

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

2.6. Block Diagram of Test Setup

Fig. 2-1 Configuration of Tested System



Adapter:

Model: BX1800-7000 Input:AC 100~240V 50/60Hz 2A Output: DC 18V/7A ♦ Shielded ♦ Unshielded

Other Support Unit(s) :

Type Name	Manufacturer	Model Name	Series
PC	ASUS	X454L	15105-0038A100
Software	CSR	BlueTest	

2.7. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: 2ALGP-VJB-105 filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

2.8. Modifications

No modifications were implemented to meet testing criteria.

2.9. NOTE

1. The EUT is a Large Full Size Vinyl Turntable Jukebox with WLAN and Bluetooth function, The functions of the EUT listed as below:

	Test Standards	Reference Report
Bluetooth-EDR	FCC Part 15 Subpart C	TZ170100238-EDR
Bluetooth-BLE	FCC Part 15 Subpart C	TZ170100238-BLE

2. The frequency bands used in this EUT are listed as follows:

Frequency Band(MHz)	2400-2483.5	5150-5350	5470-5725	5725-5850
EUT	\checkmark	—	_	_

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Dongguan Dongdian Testing Service Co.,Ltd

No.17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2014) and CISPR Publication 22.

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

IC Registration No.: 10288A-1

The 3m alternate test site of Dongguan Dongdian Testing Service Co.,Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 10288A-1 on May, 2012.

FCC-Registration No.: 270092

Dongguan Dongdian Testing Service Co.,Ltd EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 270092, Mar, 2015.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4. Test Description

Test Specification clause	Test case	Test Mode	Test Channel	Recorded In Report		Pass	Fail	NA	NP	Remark
§15.247(b)(4)	Antenna gain	GFSK	⊠ Lowest ⊠ Middle ⊠ Highest	GFSK	⊠ Lowest ⊠ Middle ⊠ Highest	\boxtimes				complies
§15.247(e)	Power spectral density	GFSK	⊠ Lowest ⊠ Middle ⊠ Highest	GFSK	⊠ Lowest ⊠ Middle ⊠ Highest					complies
§15.247(a)(2)	Spectrum bandwidth – 6 dB bandwidth	GFSK	⊠ Lowest ⊠ Middle ⊠ Highest	GFSK	⊠ Lowest ⊠ Middle ⊠ Highest	\boxtimes				complies
§15.247(b)(1)	Maximum output power	GFSK	⊠ Lowest ⊠ Middle ⊠ Highest	GFSK	⊠ Lowest ⊠ Middle ⊠ Highest	\boxtimes				complies
§15.247(d)	Band edge compliance conducted	GFSK	⊠ Lowest ⊠ Highest	GFSK	⊠ Lowest ⊠ Highest	\boxtimes				complies
§15.205	Band edge compliance radiated	GFSK	⊠ Lowest ⊠ Highest	GFSK	⊠ Lowest ⊠ Highest	\boxtimes				complies
§15.247(d)	TX spurious emissions conducted	GFSK	⊠ Lowest ⊠ Middle ⊠ Highest	GFSK	⊠ Lowest ⊠ Middle ⊠ Highest	\boxtimes				complies
§15.247(d)	TX spurious	GFSK	Lowest	GFSK	Lowest	\square				complies

	emissions radiated		⊠ Middle ⊠ Highest		⊠ Middle ⊠ Highest			
§15.109	RX spurious emissions radiated	-/-	-/-	-/-	-/-	\boxtimes		complies
§15.209(a)	TX spurious Emissions radiated < 30 MHz	GFSK	-/-	GFSK	-/-	\boxtimes		complies
§15.107(a) §15.207	Conducted Emissions < 30 MHz	GFSK	-/-	GFSK	-/-	\boxtimes		complies

Remark:

- 1. The measurement uncertainty is not included in the test result.
- 2. NA = Not Applicable; NP = Not Performed

3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the Dongguan Dongdian Testing Service Co.,Ltd quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Dongguan Dongdian Testing Service Co.,Ltd laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	3.16 dB	(1)
Radiated Emission	1~18GHz	2.56 dB	(1)
Radiated Emission	18-40GHz	2.56 dB	(1)
Conducted Disturbance	0.15~30MHz	2.44 dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6. Equipments Used during the Test

Radia	ted Method Test					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	462	2016/04/12	3 years
2	EMI TEST Receiver	Rohde&Schwarz	ESU8	100316	2016/10/25	1 years
3	EMI TEST Software	Audix	E3	6.111111	N/A	N/A
4	Horn Anternna	EMCO	3116	00060095	2016/04/12	3 years
5	Pre-Amplifer	Rohde&Schwarz	SCU-01	10049	2016/10/25	1 years
6	Pre-Amplifer	A.H.	PAM0-0118	360	2016/10/25	1 years
7	Pre-Amplifer	A.H.	PAM- 1840VH	562	2016/10/25	1 years
8	Double Ridged Horn Antenna	Rohde&Schwarz	HF907	100265	2016/04/12	3 years
9	Active Loop Antenna	Schwarz beck	FMZB1519	0.38	2016/04/12	3 years
11	TURNTABLE	MATURO	TT2.0		N/A	N/A
12	ANTENNA MAST	MATURO	TAM-4.0-P		N/A	N/A
13	Spectrum Analyzer	R&S	FSU26	1166.1660.26	2016/10/25	1 years
14	Horn Antenna	SCHWARZBECK	BBHA 9170	1123	2016/08/19	1 years

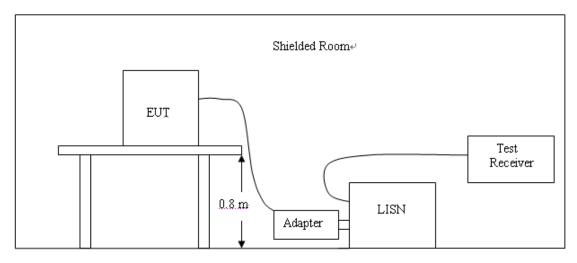
Conduc	Conducted Method Test										
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval					
1	Power Sensor	Rohde&Schwarz	NRP-Z81	102638	2016/11/02	1 years					
2	Spectrum Analyzer	Agilent	N9030A	MY49430428	2016/11/02	1 years					

AC Po	AC Power Conducted Emission											
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval						
1	Artificial Mains	Rohde&Schwarz	ENV216	101109	2016/10/25	1 years						
2	Artificial Mains	Rohde&Schwarz	ESH3-Z5	100309	2016/10/25	1 years						
3	EMI Test Receiver	Rohde&Schwarz	ESU8	100316	2016/10/25	1 years						
4	Pulse Limiter	Rohde&Schwarz	ESH3-Z2	101242	2016/10/25	1 years						

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a standfloor system and is placed on the ground plane as per ANSI C63.10-2013.

2 Support equipment, if needed, was placed as per ANSI C63.10-2013;

3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013;

4 The EUT received DC18V power from the adapter, the adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.

5 All support equipments received AC power from a second LISN, if any.

6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.

7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

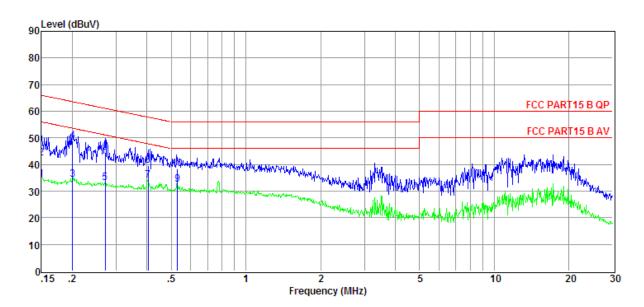
For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

F ree on the second	Maximum RF Line Voltage (dBµV)							
Frequency (MHz)	CLA	SS A	CLASS B					
	Q.P.	Ave.	Q.P.	Ave.				
0.15 - 0.50	79	66	66-56*	56-46*				
0.50 - 5.00	73	60	56	46				
5.00 - 30.0	73	60	60	50				

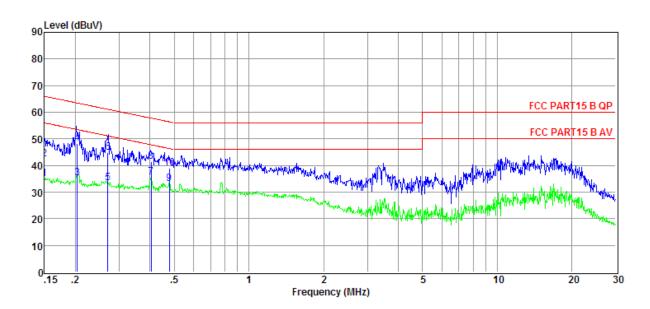
* Decreasing linearly with the logarithm of the frequency

TEST RESULTS

Pre-scan all mode and recorded the worst case results in this report (BT Link @120VAC).



Item (Mark)	Freq (MHz)	Read Level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Pulse Limiter Factor (dB)	Results Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Detector	Phase
1	0.15	14.95	9.60	0.01	9.84	34.40	56.00	-21.60	Average	NEUTRAL
2	0.15	22.88	9.60	0.01	9.84	42.33	66.00	-23.67	QP	NEUTRAL
3	0.20	15.10	9.59	0.02	9.85	34.56	53.58	-18.89	Average	NEUTRAL
4	0.20	29.42	9.59	0.02	9.85	48.88	63.58	-14.57	QP	NEUTRAL
5	0.27	13.67	9.60	0.02	9.85	33.14	51.07	-17.98	Average	NEUTRAL
6	0.27	25.10	9.60	0.02	9.85	44.57	61.07	-16.55	QP	NEUTRAL
7	0.40	14.61	9.61	0.03	9.86	34.11	47.77	-13.66	Average	NEUTRAL
8	0.40	20.19	9.61	0.03	9.86	39.69	57.77	-18.08	QP	NEUTRAL
9	0.53	12.83	9.61	0.04	9.87	32.35	46.00	-14.01	Average	NEUTRAL
10	0.53	18.75	9.61	0.04	9.87	38.27	56.00	-18.09	QP	NEUTRAL



ltem (Mark)	Freq (MHz)	Read Level (dBuV)	LISN Factor (dB)	Cable Loss (dB)	Pulse Limiter Factor (dB)	Results Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Detector	Phase
1	0.15	15.96	9.61	0.01	9.84	35.42	56.00	-20.58	Average	LINE
2	0.15	22.92	9.61	0.01	9.84	42.38	66.00	-23.62	QP	LINE
3	0.20	15.82	9.62	0.02	9.85	35.31	53.45	-18.14	Average	LINE
4	0.20	29.00	9.62	0.02	9.85	48.49	63.45	-14.96	QP	LINE
5	0.27	14.06	9.62	0.02	9.85	33.55	51.12	-17.57	Average	LINE
6	0.27	25.54	9.62	0.02	9.85	45.03	61.12	-16.09	QP	LINE
7	0.40	16.12	9.63	0.03	9.86	35.64	47.77	-12.13	Average	LINE
8	0.40	21.73	9.63	0.03	9.86	41.25	57.77	-16.52	QP	LINE
9	0.48	13.80	9.63	0.03	9.87	33.33	46.36	-13.03	Average	LINE
10	0.48	19.76	9.63	0.03	9.87	39.29	56.36	-17.07	QP	LINE

Note:

1. Result Level = Read Level +LISN Factor + Pulse Limiter Factor + Cable loss.

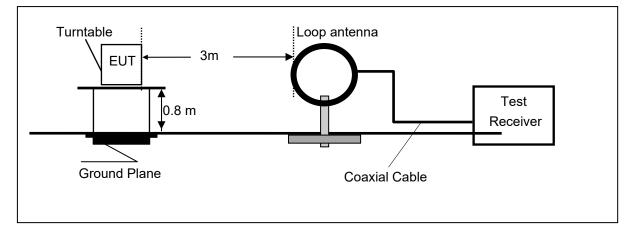
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz), Step size: 4 kHz, Scan time: auto.

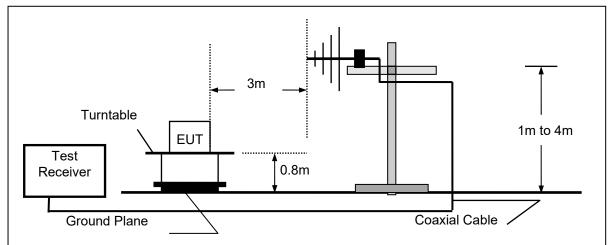
4.2. Radiated Emission

TEST CONFIGURATION

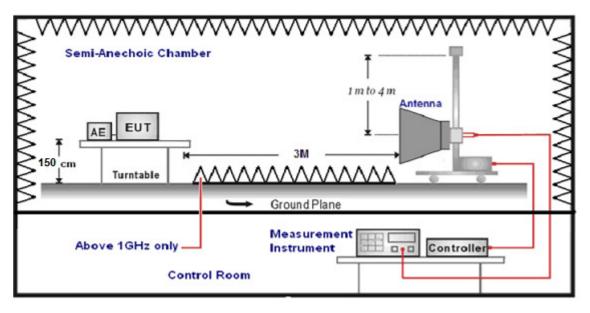
Frequency range 9KHz - 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

1) Sequence of testing 9 kHz to 30 MHz

Setup:

- --- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- --- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.
- --- If the EUT is a floor standing device, it is placed on the ground.
- --- Auxiliary equipment and cables were positioned to simulate normal operation conditions.
- --- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- --- The measurement distance is 3 meter.
- --- The EUT was set into operation.

Premeasurement:

--- The turntable rotates from 0° to 315° using 45° steps.

--- The antenna height is 0.8 meter.

--- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

--- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz

Setup:

- --- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- --- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- --- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- --- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- --- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- --- The EUT was set into operation.

Premeasurement:

- --- The turntable rotates from 0° to 315° using 45° steps.
- --- The antenna is polarized vertical and horizontal.
- --- The antenna height changes from 1 to 3 meter.

- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position $(\pm 45^{\circ})$ and antenna movement between 1 and 4 meter.

--- The final measurement will be done with QP detector with an EMI receiver.

--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

3) Sequence of testing 1 GHz to 18 GHz

Setup

- --- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- --- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- --- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- --- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- --- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- The measurement distance is 3 meter.
- --- The EUT was set into operation.

Premeasurement:

- --- The turntable rotates from 0° to 315° using 45° steps.
- --- The antenna is polarized vertical and horizontal.
- --- The antenna height scan range is 1 meter to 2.5 meter.
- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.

--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

4) Sequence of testing above 18 GHz

Setup:

- --- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.
- --- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.
- --- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- --- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- --- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- --- The measurement distance is 1 meter.
- --- The EUT was set into operation.

Premeasurement:

--- The antenna is moved spherical over the EUT in different polarisations of the antenna.

Final measurement:

--- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

Instruments Setting

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	QP	
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP
	Peak Value: RBW=1MHz/VBW=3MHz,	
1GHz-40GHz	Sweep time=Auto	Peak
	Average Value: RBW=1MHz/VBW=10Hz,	
	Sweep time=Auto	

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

For example

Frequency	FS	RA	AF	CL	AG	Transd
(MHz)	(dBµV/m)	(dBµV/m)	(dB)	(dB)	(dB)	(dB)
300.00	40	58.1	12.2	1.6	31.90	

Transd=AF +CL-AG

RADIATION LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio

frequency power that is produced by the intentional radiator shall be at least 20dB below that in the100kHz bandwidth within the band that contains the highest level of desired power.

The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos.

Frequency (MHz)	Distance (Meters)	Radiated (dBµV/m)	Radiated (µV/m)		
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)		
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)		
1.705-30	3	20log(30)+ 40log(30/3)	30		
30-88	3	40.0	100		
88-216	3	43.5	150		
216-960	3	46.0	200		
Above 960	3	54.0	500		

TEST RESULTS

Remark: 1. We tested BT Link mode for below 1G;

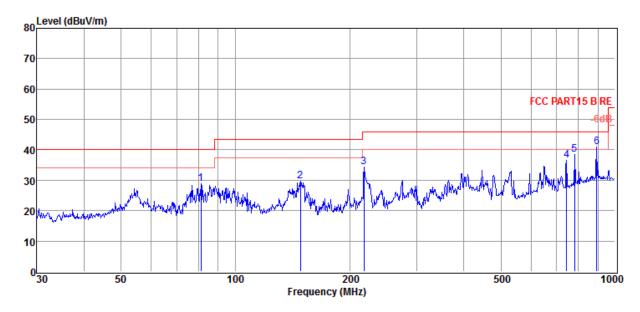
For 9KHz to 30MHz

Frequency (MHz)	Corrected Reading (dBµV/m)@3m	FCC Limit (dBµV/m) @3m	Over Limit (dB)	Detector
				QP

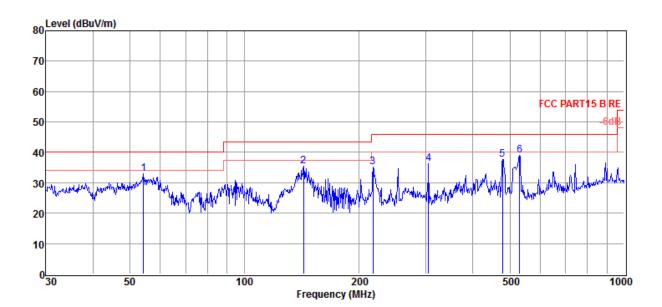
Remark:

- 1. Over Limit = Emission level Limit value
- 2. "---" states emission level at least lower than limit 20dB, so without recorded any values;

For 30MHz to 1000MHz



ltem (Mark)	Frequency (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	81.35	18.52	9.15	1.36	29.03	40.00	-10.97	QP	HORIZONTAL
2	148.44	19.46	8.67	1.79	29.92	43.50	-13.58	QP	HORIZONTAL
3	218.22	20.94	10.90	2.20	34.04	46.00	-11.96	QP	HORIZONTAL
4	744.92	12.50	19.33	4.52	36.35	46.00	-9.65	QP	HORIZONTAL
5	782.79	13.76	20.17	4.66	38.59	46.00	-7.41	QP	HORIZONTAL
6	894.06	14.36	22.03	4.95	41.34	46.00	-4.66	QP	HORIZONTAL



ltem (Mark)	Frequency (MHz)	Read Level (dBµV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBµV/m)	Limit Line (dBµV/m)	Over Limit (dB)	Detector	Polarization
1	54.61	16.96	14.20	1.09	32.25	40.00	-7.75	QP	VERTICAL
2	143.98	25.42	8.83	1.72	35.97	43.50	-7.53	QP	VERTICAL
3	217.79	22.48	10.90	2.20	35.58	46.00	-10.42	QP	VERTICAL
4	305.68	19.82	13.50	2.72	36.04	46.00	-9.96	QP	VERTICAL
5	479.42	18.56	15.98	3.62	38.16	46.00	-7.84	QP	VERTICAL
6	531.34	19.43	16.51	3.73	39.67	46.00	-6.33	QP	VERTICAL

Remark:

- 1. Over Limit = Emission level Limit value
- 2. "---" states emission level at least lower than limit 20dB, so without recorded any values;
- 3. Result Level = Read Level + Antenna Factor + Cable loss PRM Factor.
- 4. Pre-scan all mode and recorded the worst case results in this report (BT LE (Low Channel)).

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1 48 1 48 2 72 2 72 2 72 1 48 1 48 1 48 1 48 2 73 2 73 2 73 2 73 1 48 1 48 2 73 2 73 2 73 1 48 1 48 1 48 1 73 2 73 2 73	Freq MHz) (3206) (4880) (4880) (320)	44.15 24.63 41.78 23.09 Read Level (dBμV) 38.17 27.58 44.75	35.40 35.40 37.20 37.20 M Antenna Factor (dB/m) 35.46 35.46 35.46 37.28	29.13 29.13 30.03 30.03 iddle Ch PRM Factor dB 29.16 29.16 30.08	12.07 12.07 15.29 15.29 Cable Loss (dB) 12.17 12.17 15.44	62.49 42.97 64.24 45.55 Channel 1 Result Level (dBμV/m) 56.64 46.05 67.39	74 54 74 54 9 @ 2440 M Limit Line (dBµV/m) 74 54 74	-11.51 -11.03 -9.76 -8.45 Hz Over Limit (dB) -17.36 -7.95	AV Peak AV Detector Peak AV Peak	Vertical Vertical Vertical Polarization Horizontal Horizontal Horizontal		
1 48 2 72 2 72 2 72 1 48 1 48 2 73 2 73 2 73 1 48 2 73 2 73 1 48 2 73 1 48 2 73 1 48 1 48 2 73 2 73	804 '206 '207 '208 '208 '208 '208 '208 '208 '208 '208 <	24.63 41.78 23.09 Read Level (dBµV) 38.17 27.58 44.75	35.40 37.20 37.20 M Antenna Factor (dB/m) 35.46 35.46 35.46 37.28	29.13 30.03 30.03 iddle Ch PRM Factor dB 29.16 29.16 30.08	12.07 15.29 15.29 Cable Loss (dB) 12.17 12.17 15.44	42.97 64.24 45.55 Channel 1 Result Level (dBμV/m) 56.64 46.05 67.39	54 74 54 9 @ 2440 M Limit Line (dBµV/m) 74 54 74	-11.03 -9.76 -8.45 Hz Over Limit (dB) -17.36 -7.95	AV Peak AV Detector Peak AV Peak	Vertical Vertical Vertical Polarization Horizontal Horizontal Horizontal		
2 72 2 72 2 72 Item Free (Mark) (Mir 1 48 2 73 2 73 2 73 1 48 2 73 2 73 1 48 2 73 2 73 1 48 2 73 2 73 (Mark) (Mir	7206 7206 7206 77 77 77 77 77 77 77 77 77 77 77 77 77	41.78 23.09 Read Level (dBμV) 38.17 27.58 44.75	37.20 37.20 M Antenna Factor (dB/m) 35.46 35.46 35.46 37.28	30.03 30.03 PRM Factor dB 29.16 29.16 30.08	15.29 15.29 Cable Loss (dB) 12.17 12.17 15.44	64.24 45.55 Channel 1 Result Level (dBμV/m) 56.64 46.05 67.39	74 54 9 @ 2440 M Limit Line (dBμV/m) 74 54 74	-9.76 -8.45 Hz Over Limit (dB) -17.36 -7.95	Peak AV Detector Peak AV Peak	Vertical Vertical Polarization Horizontal Horizontal Horizontal		
2 72 Item (Mark) Free (Mini- (Mini- 2) 1 488 1 488 2 733 2 733 Item (Mark) Free (Mini- (Mini- (Mini-	Freq MHz) (880 (320	23.09 Read Level (dBµV) 38.17 27.58 44.75	37.20 37.20 M Antenna Factor (dB/m) 35.46 35.46 35.46 37.28	30.03 iddle Ch PRM Factor dB 29.16 29.16 30.08	15.29 Cable Loss (dB) 12.17 12.17 15.44	45.55 Channel 1 Result Level (dBμV/m) 56.64 46.05 67.39	54 9 @ 2440 Μ Limit Line (dBμV/m) 74 54 74	-8.45 Hz Over Limit (dB) -17.36 -7.95	AV Detector Peak AV Peak	Vertical Polarization Horizontal Horizontal Horizontal		
2 72 Item (Mark) Free (Mini- (Mini- 2) 1 489 1 489 2 733 2 733 Item (Mark) Free (Mini- (Mini- (Mini-	Freq MHz) (880 (320	23.09 Read Level (dBµV) 38.17 27.58 44.75	37.20 M Antenna Factor (dB/m) 35.46 35.46 35.46 37.28	30.03 iddle Ch PRM Factor dB 29.16 29.16 30.08	15.29 Cable Loss (dB) 12.17 12.17 15.44	45.55 Channel 1 Result Level (dBμV/m) 56.64 46.05 67.39	54 9 @ 2440 Μ Limit Line (dBμV/m) 74 54 74	-8.45 Hz Over Limit (dB) -17.36 -7.95	AV Detector Peak AV Peak	Vertical Polarization Horizontal Horizontal Horizontal		
Item (Mark) Fre (Mini- (Mini- 1 1 489 1 489 2 733 2 733 2 733 Item (Mark) Fre (Mark)	Freq MHz) (880 (880 (320	Read Level (dBµV) 38.17 27.58 44.75	<i>M</i> Antenna Factor (dB/m) 35.46 35.46 37.28	<i>iddle Ch</i> PRM Factor dB 29.16 29.16 30.08	Cable Loss (dB) 12.17 12.47 15.44	Channel 1 Result Level (dBμV/m) 56.64 46.05 67.39	9 @ 2440 Μ Limit Line (dBμV/m) 74 54 74	Hz Over Limit (dB) -17.36 -7.95	Detector Peak AV Peak	Polarization Horizontal Horizontal Horizontal		
(Mark) (Mithem 1 483 1 483 2 733 2 733 1 2 1 483 2 733 2 733 1 483 1 483 2 733 1 5 1 5 1 6 1 483 2 733 1 5 1 5 1 6 1 6 1 7 1 7 1 7 1 6 1 6 1 7 1 7 1 7 1 7 1 7 1 7 1 7 1 7 1 7	MHz) (1880 1880 7320	Level (dBµV) 38.17 27.58 44.75	Antenna Factor (dB/m) 35.46 35.46 37.28	PRM Factor dB 29.16 29.16 30.08	Cable Loss (dB) 12.17 12.17 15.44	Result Level (dBµV/m) 56.64 46.05 67.39	Limit Line (dBµV/m) 74 54 74	Over Limit (dB) -17.36 -7.95	Peak AV Peak	Horizontal Horizontal Horizontal		
(Mark) (Mit 1 483 1 483 2 733 2 733 2 733 Item (Mark) Fra (Mit	MHz) (1880 1880 7320	Level (dBµV) 38.17 27.58 44.75	Antenna Factor (dB/m) 35.46 35.46 37.28	PRM Factor dB 29.16 29.16 30.08	Cable Loss (dB) 12.17 12.17 15.44	Result Level (dBµV/m) 56.64 46.05 67.39	Limit Line (dBµV/m) 74 54 74	Over Limit (dB) -17.36 -7.95	Peak AV Peak	Horizontal Horizontal Horizontal		
(Mark) (Mit 1 483 1 483 2 733 2 733 2 733 Item (Mark) Fra (Mit	MHz) (1880 1880 7320	Level (dBµV) 38.17 27.58 44.75	Factor (dB/m) 35.46 35.46 37.28	Factor dB 29.16 29.16 30.08	Loss (dB) 12.17 12.17 15.44	Level (dBµV/m) 56.64 46.05 67.39	Line (dBµV/m) 74 54 74	Limit (dB) -17.36 -7.95	Peak AV Peak	Horizontal Horizontal Horizontal		
1 48 1 48 2 73 2 73 1 2 73 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	880 880 7320	(dBµV) 38.17 27.58 44.75	(dB/m) 35.46 35.46 37.28	dB 29.16 29.16 30.08	(dB) 12.17 12.17 15.44	(dBµV/m) 56.64 46.05 67.39	(dBµV/m) 74 54 74	(dB) -17.36 -7.95	Peak AV Peak	Horizontal Horizontal Horizontal		
1 48 2 73 2 73 1 1 2 73 1 1 1 1 1 1 2 73 1 1 <td>880 880 320</td> <td>38.17 27.58 44.75</td> <td>35.46 35.46 37.28</td> <td>29.16 29.16 30.08</td> <td>12.17 12.17 15.44</td> <td>56.64 46.05 67.39</td> <td>74 54 74</td> <td>-17.36 -7.95</td> <td>AV Peak</td> <td>Horizontal Horizontal</td>	880 880 320	38.17 27.58 44.75	35.46 35.46 37.28	29.16 29.16 30.08	12.17 12.17 15.44	56.64 46.05 67.39	74 54 74	-17.36 -7.95	AV Peak	Horizontal Horizontal		
1 48 2 73 2 73 1 1 2 73 1 1 1 1 1 1 2 73 1 1 <td>880 320</td> <td>27.58 44.75</td> <td>35.46 37.28</td> <td>29.16 30.08</td> <td>12.17 15.44</td> <td>46.05 67.39</td> <td>54 74</td> <td>-7.95</td> <td>AV Peak</td> <td>Horizontal Horizontal</td>	880 320	27.58 44.75	35.46 37.28	29.16 30.08	12.17 15.44	46.05 67.39	54 74	-7.95	AV Peak	Horizontal Horizontal		
2 73 2 73 Item Fre (Mark) (Mr	'320	44.75	37.28	30.08	15.44	67.39	74		Peak	Horizontal		
2 73: Item Fre (Mark) (MH								0.01				
Item Fre (Mark) (MH	020	24.70	07.20	00.00	10.44		54	-6.6	AV	Horizontal		
(Mark) (Mł												
(Mark) (Mł		Read	Antenna	PRM	Cable	Result	Limit	Over				
. , .	req	Level	Factor	Factor	Loss	Level	Line	Limit	Detector	Polarization		
1 10	MHz)	(dBµV)	(dB/m)	dB	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Deteotor	rolanzation		
		45.62	35.46	29.16	12.17	64.09	(dDµ (////) 74	-9.91	Peak	Vertical		
		20.96	35.46	29.16	12.17	39.43	54	-14.57	AV	Vertical		
		44.63	37.28	30.08	15.44	67.27	74	-6.73	Peak	Vertical		
		25.06	37.28	30.08	15.44	47.7	54	-6.3	AV	Vertical		
2 13	520	23.00	57.20	30.00	13.44	47.7	54	-0.5	Αv	Ventical		
			L	High Cha	nnal @	Channel 39	@ 2/80 ME	17				
		Read	Antenna	PRM	Cable	Result	Limit	Over				
Item Fre	Freq	Level		Factor		Level	Line	Limit	Detector	Polarization		
(Mark) (Mł	MHz)	(dBµV)	(dB/m)	dB	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Delector	FUIAIIZALIUT		
1 49		48.17	35.52	29.19	12.28	66.78	(dDµ v/m) 74	-7.22	Peak	Horizontal		
		22.43	35.52	29.19	12.20	41.04	54	-12.96	AV	Horizontal		
		44.48	35.52	30.12	12.20	67.33	54 74	-6.67	Peak	Horizontal		
							54	-6.72				
Z 74	440	24.43	37.37	30.12	15.60	47.28	54	-0.72	AV	Horizontal		
		Dood	Antonno		Cable	Booult	Limit	Over				
	Freq	Read	Antenna	PRM Factor	Cable	Result	Limit	Over	Detector	Dolorization		
			Factor	Factor	Loss			Limit	Detector	Polarization		
	((dBµV)	(dB/m)	dB	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Desile	\ (= ut ! = - 1		
		40.48	35.52	29.19	12.28	59.09	74	-14.91	Peak	Vertical		
		17.53	35.52	29.19	12.28	36.14	54	-17.86	AV	Vertical		
		41.36	37.37	30.12	15.60	64.21	74	-9.79	Peak	Vertical		
2 74	'440	21.52	37.37	30.12	15.60	44.37	54	-9.63	AV	Vertical		

4 1 CU- to 25 CU

REMARKS:

1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

2. The other emission levels were very low against the limit.

3. Over Limit=Emission Level - Limit.

4. The average measurement was not performed when the peak measured data under the limit of average detection.

4.3. Maximum Peak Output Power

TEST CONFIGURATION



TEST PROCEDURE

According to KDB558074 D01 DTS Measurement Guidance Section 9.1 Maximum peak conducted output power, 9.1.2.

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

<u>LIMIT</u>

The Maximum Peak Output Power Measurement is 30dBm.

TEST RESULTS

A. Test Verdict

Channel	Frequency (MHz)	Measured Output Peak Power (dBm)	Limits (dBm)	Verdict
00	2402	-4.56	30	PASS
19	2440	-4.78	30	PASS
39	2480	-3.58	30	PASS

Note: 1.The test results including the cable lose.

4.4. Power Spectral Density

TEST CONFIGURATION



TEST PROCEDURE

1.Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.

2.Set the RBW =100 kHz.

3.Set the VBW =300 KHz.

4.Set the span to 1.5 times the DTS channel bandwidth.

5.Detector = peak.

6.Sweep time = auto couple.

7.Trace mode = max hold.

8.Allow trace to fully stabilize.

9.Use the peak marker function to determine the maximum power level.

10.If measured value exceeds limit, reduce RBW(no less than 3 kHz)and repeat.

11. The resulting peak PSD level must be 8 dBm.

<u>LIMIT</u>

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.

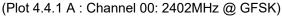
TEST RESULTS

A. Test Verdict

Channel	Frequency (MHz)	Report PSD (dBm/100kHz)	Refer to Plot	Limits (dBm/3KHz)	Verdict
00	2402	-6.871	Plot 4.4.1 A	8	PASS
19	2440	-7.028	Plot 4.4.1 B	8	PASS
39	2480	-6.986	Plot 4.4.1 C	8	PASS

B. Test Plots







(Plot 4.4.1 B : Channel 19: 2440MHz @ GFSK)



(Plot 4.4.1 C : Channel 39: 2480MHz @ GFSK)

4.5. 6dB Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW=100 KHz and VBW=300KHz. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB. According to KDB558074 D01 V03 for one of the following procedures may be used to determine the modulated DTS device signal bandwidth.

- 1. Set RBW = 100 kHz.
- 2. Set the video bandwidth (VBW) \geq 3 RBW.
- 3. Detector = Peak.
- 4. Trace mode = max hold.
- 5. Sweep = auto couple.
- 6. Allow the trace to stabilize.

7. 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.

<u>LIMIT</u>

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz

TEST RESULTS

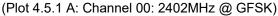
•	T () ()	
Α.	Test Verdic	t

Channel	Frequency (MHz)	6 dB Bandwidth (KHz)	Refer to Plot	Limits (kHz)	Verdict
00	2402	694.9	Plot 4.5.1 A	≥500	PASS
19	2440	704.1	Plot 4.5.1 B	≥500	PASS
39	2480	703.5	Plot 4.5.1 C	≥500	PASS

Note: 1.The test results including the cable lose.

B. Test Plots







M



(Plot 4.5.1 B: Channel 19: 2440MHz @ GFSK)

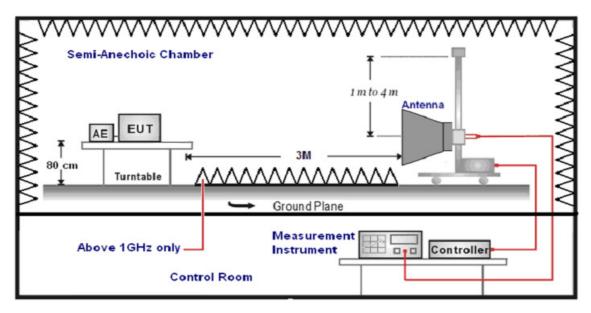
(Plot 4.5.1 C: Channel 39: 2480MHz @ GFSK)

4.6. Band Edge Compliance of RF Emission

TEST REQUIREMENT

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 §15.205(a).

TEST CONFIGURATION



TEST PROCEDURE

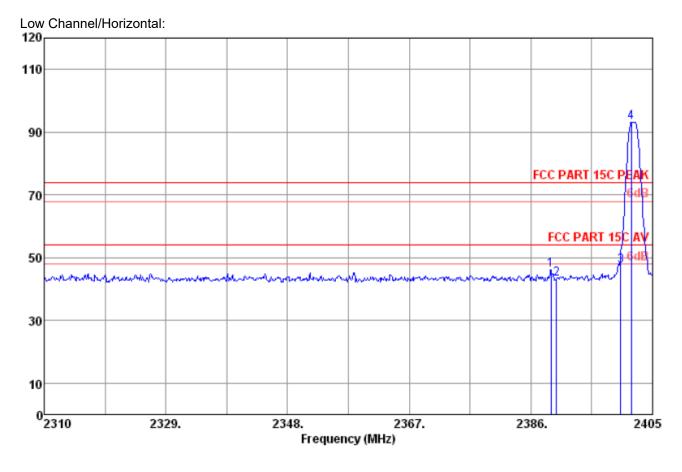
- 1. The EUT was placed on the ground.
- 2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
- 3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 4. Repeat above procedures until all frequency measurements have been completed..
- 5. The distance between test antenna and EUT was 3 meter:
- 6. Setting test receiver/spectrum as following table states:

e etting to ettine in ep		
Test Frequency range	Detector	
	Peak Value: RBW=1MHz/VBW=3MHz,	
	Sweep time=Auto	Peak
1GHz-40GHz	Average Value: RBW=1MHz/VBW=10Hz,	reak
	Sweep time=Auto	
	· · · ·	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz,

<u>LIMIT</u>

Below -20dB of the highest emission level in operating band. 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)

TEST RESULTS



Freq	Read	Antenna	PRM	Cable	Result	Limit	Over		
	Level	Factor	Factor	Loss	Level	Line	Limit	Detector	Polarization
(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)		
2389.14	37.82	29.99	30.21	8.35	45.95	54	-28.05	Peak	Horizontal
2390	34.96	29.99	30.21	8.35	43.09	54	-30.91	Peak	Horizontal
2400	39.38	29.99	30.21	8.35	47.51			Peak	Horizontal
2401.68	85.14	29.99	30.21	8.35	93.27			Peak	Horizontal

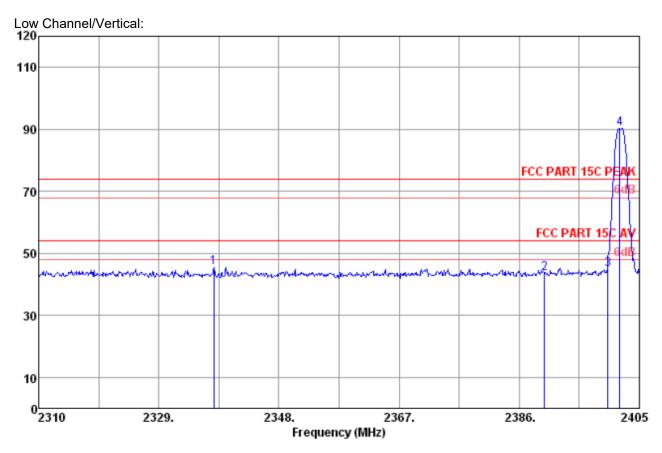
REMARKS:

1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

2. The other emission levels were very low against the limit.

3. Over Limit=Emission Level - Limit.

4. The average measurement was not performed when the peak measured data under the limit of average detection.



Erog	Read	Antenna	PRM	Cable	Result	Limit	Over		
Freq	Level	Factor	Factor	Loss	Level	Line	Limit	Detector	Polarization
(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)		
2337.74	37.46	29.99	30.21	8.35	45.59	54	-28.41	Peak	Vertical
2390.00	35.65	29.99	30.21	8.35	43.78	54	-30.22	Peak	Vertical
2400.00	36.39	30.25	30.25	8.5	44.89			Peak	Vertical
2401.87	81.63	30.25	30.25	8.5	90.13			Peak	Vertical

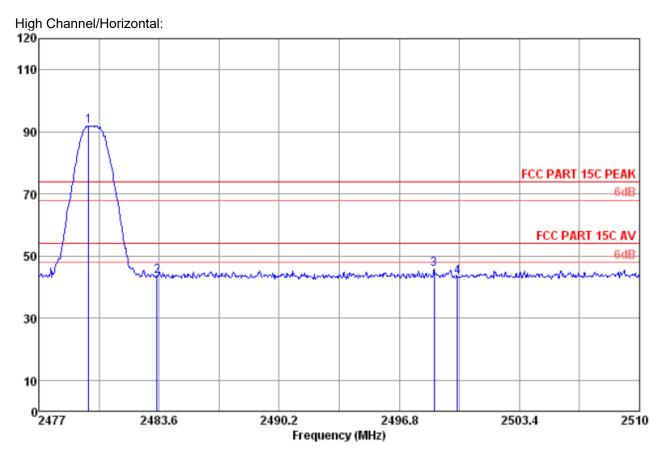
REMARKS:

1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

2. The other emission levels were very low against the limit.

3. Over Limit=Emission Level - Limit.

4. The average measurement was not performed when the peak measured data under the limit of average detection.



Frog	Read	Antenna	PRM	Cable	Result	Limit	Over		
Freq	Level	Factor	Factor	Loss	Level	Line	Limit	Detector	Polarization
(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)		
2479.74	83.04	30.25	30.25	8.5	91.54			Peak	Horizontal
2483.5	35.27	30.25	30.25	8.5	43.77	54	-30.23	Peak	Horizontal
2498.71	37.19	30.25	30.25	8.5	45.69	54	-28.31	Peak	Horizontal
2500	34.83	30.25	30.25	8.5	43.33	54	-30.67	Peak	Horizontal

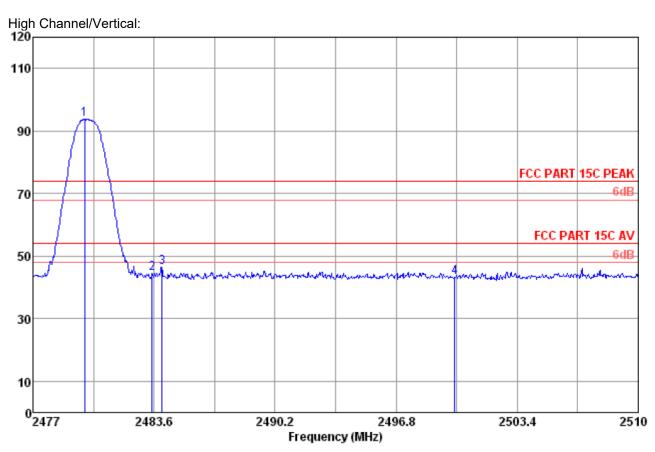
REMARKS:

1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

2. The other emission levels were very low against the limit.

3. Over Limit=Emission Level - Limit.

4. The average measurement was not performed when the peak measured data under the limit of average detection.



Fred	Read	Antenna	PRM	Cable	Result	Limit	Over		
Freq	Level	Factor	Factor	Loss	Level	Line	Limit	Detector	Polarization
(MHz)	(dBµV)	(dB/m)	(dB)	(dB)	(dBµV/m)	(dBµV/m)	(dB)		
2479.81	85.27	30.25	30.25	8.5	93.77			Peak	Vertical
2483.5	36.16	30.25	30.25	8.5	44.66	54	-29.34	Peak	Vertical
2484.03	37.99	30.25	30.25	8.5	46.49	54	-27.51	Peak	Vertical
2500	35.37	30.25	30.25	8.5	43.87	54	-30.13	Peak	Vertical

REMARKS:

1. Result Level = Read Level + Antenna Factor + Cable loss - PRM Factor.

2. The other emission levels were very low against the limit.

3. Over Limit=Emission Level - Limit.

4. The average measurement was not performed when the peak measured data under the limit of average detection.

4.7. Spurious RF Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBW= 300KHz to measure the peak field strength , and mwasure frequeny range from 9KHz to 26.5GHz.

<u>LIMIT</u>

1. Below -20dB of the highest emission level in operating band.

2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

TEST RESULTS

Remark: The measurement frequency range is from 9KHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandege measurement data.

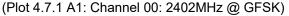
Channel	Frequency (MHz)	Frequency Range	Refer to Plot	Limit (dBc)	Verdict
		2402MHz	Plot 4.7.1 A1	N/A	PASS
		9KHz-30MHz Plot 4.7.1 A2 -20		-20	PASS
00	2402	30MHz-1GHz	Plot 4.7.1 A3	-20	PASS
00	2402	1GHz-8GHz	Plot 4.7.1 A4	-20	PASS
		8GHz-16GHz	Plot 4.7.1 A5	-20	PASS
		16GHz-26.5GHz	Plot 4.7.1 A6	-20	PASS
		2440MHz	Plot 4.7.1 B1	N/A	PASS
		9KHz-30MHz	Plot 4.7.1 B2	-20	PASS
19	2440	30MHz-1GHz	Plot 4.7.1 B3	-20	PASS
19	2440	1GHz-8GHz	Plot 4.7.1 B4	-20	PASS
		8GHz-16GHz	Plot 4.7.1 B5	-20	PASS
		16GHz-26.5GHz	Plot 4.7.1 B6	-20	PASS
		2480MHz	Plot 4.7.1 C1	N/A	PASS
		9KHz-30MHz	Plot 4.7.1 C2	-20	PASS
39	2480	30MHz-1GHz	Plot 4.7.1 C3	-20	PASS
39	2400	1GHz-8GHz	Plot 4.7.1 C4	-20	PASS
		8GHz-16GHz	Plot 4.7.1 C5	-20	PASS
		16GHz-26.5GHz	Plot 4.7.1 C6	-20	PASS

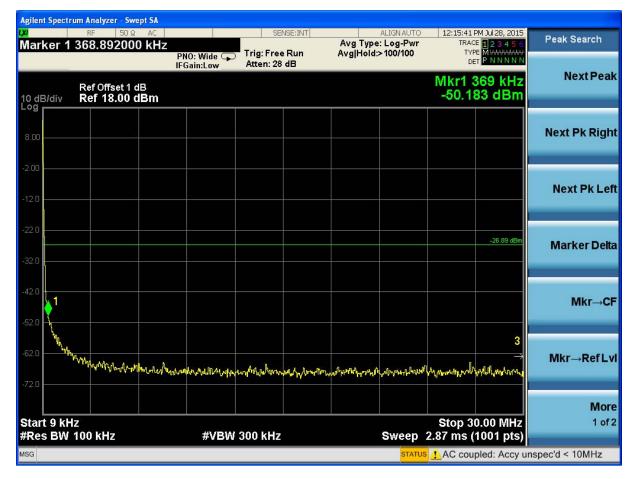
Α.	Test	Verdict
----	------	---------

Frequency (MHz)	Delta Peak to Band emission (dBc)	Detector	Limit (dBc)	Refer to Plot	Verdict
2400.00	-53.055	Peak	-20	Plot 4.7.1 D	PASS
2483.50	-55.423	Peak	-20	Plot 4.7.1 E	PASS

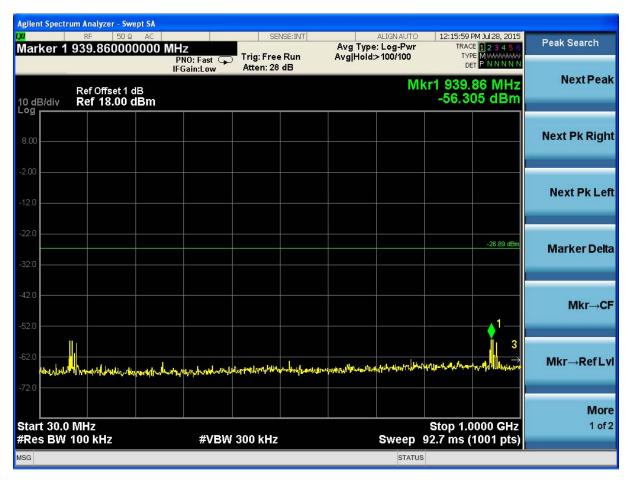
B. Test Plots

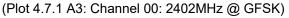


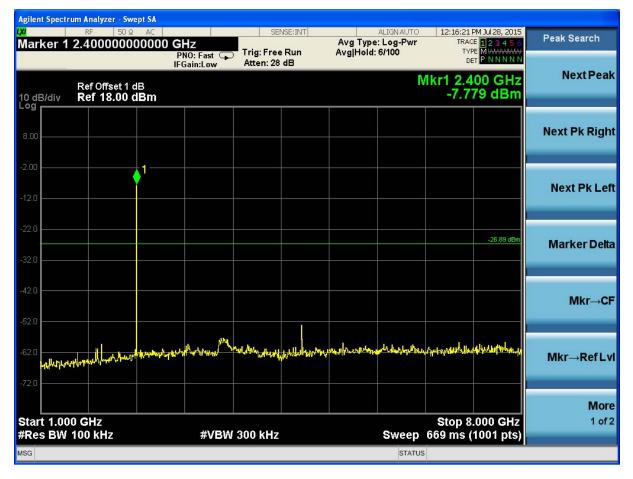




(Plot 4.7.1 A2: Channel 00: 2402MHz @ GFSK)







(Plot 4.7.1 A4: Channel 00: 2402MHz @ GFSK)

	um Analyzer - Swept								
(X) Marker 1	RF 50 Ω 15.16800000		SENS	SE:INT	Avg Type:	ALIGNAUTO		PM Jul 28, 2015 E 1 2 3 4 5 6	Peak Search
Marker	13.10000000	PNO: Fast IFGain:Low	Trig: Free F Atten: 28 d	Run /	Avg Hold:		TYP		
10 dB/div Log	Ref Offset 1 dB Ref 18.00 dB	m				M	kr1 15.1 -53.0	68 GHz 95 dBm	Next Peak
8.00						9			Next Pk Right
-2.00 -12.0									Next Pk Left
-22.0								-26.89 dBm	Marker Delta
-42.0								1	Mkr→CF
-62.0 <mark>/ - 1945-1</mark> 44	hadpollowighter der flat bla	atra data data data data data data data	, nander and	โทยได้เกล้า ะปรุ่งกัดก	white and an and	Williamthore the set	bould supervised	water water	Mkr→RefLvl
-72.0 Start 8.000 #Res BW		^ #VBW	300 kHz			Sweep	Stop 16 765 ms (.000 GHz 1001 pts)	More 1 of 2
MSG						STATUS			

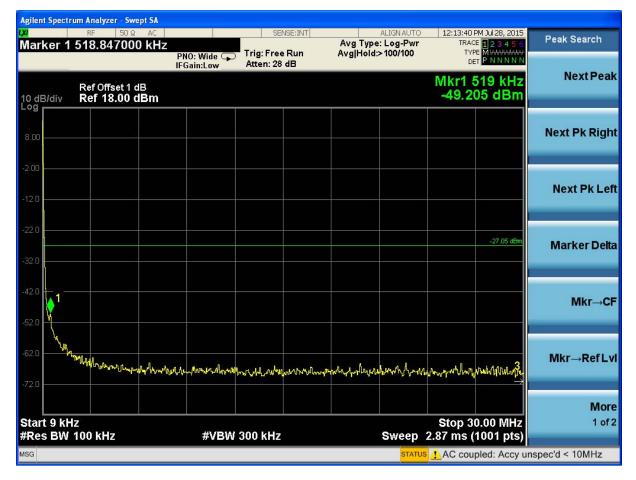
(Plot 4.7.1 A5: Channel 00: 2402MHz @ GFSK)



(Plot 4.7.1 A6: Channel 00: 2402MHz @ GFSK)

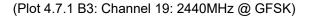


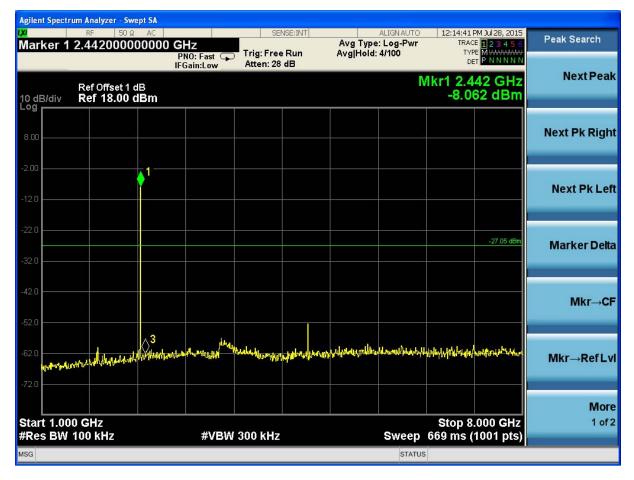




(Plot 4.7.1 B2: Channel 19: 2440MHz @ GFSK)

Agilent Spectrum Analyzer - Swept SA					
KF 50 Ω AC Marker 1 943.740000000		SE:INT AVG Type:		PM Jul 28, 2015	Peak Search
Marker 1 943.74000000	PNO: Fast Trig: Free IFGain:Low Atten: 28 of	Run Avg Hold:>	100/100 TYF DE		NextBeak
Ref Offset 1 dB 10 dB/div Ref 18.00 dBm			Mkr1 943. -51.3	74 MHz 06 dBm	Next Peak
8.00					Next Pk Right
-2.00					Next Pk Left
-22.0				-27.05 dBm	Marker Delta
-42.0				↓ ¹	Mkr→CF
-52.0 -62.0	Morganioustalionalprovality	Yor.A.p	manuphrister	Walnut Incruige	Mkr→RefLvl
-72.0 Start 30.0 MHz #Res BW 100 kHz	#VBW 300 kHz		Stop 1.0 Sweep 92.7 ms (→ 0000 GHz 1001 pts)	More 1 of 2
MSG	**************************************		STATUS		





(Plot 4.7.1 B4: Channel 19: 2440MHz @ GFSK)

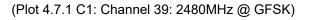
	um Analyzer - Swe									
Start Ered	RF 50 Ω α 8.0000000			SEI	VSE:INT	Avg Typ	ALIGNAUTO e: Log-Pwr		PM Jul 28, 2015 E 1 2 3 4 5 6	Frequency
Otantino	9 0.0000000	PN	IO: Fast 😱 ain:Low	Trig: Free Atten: 28		AvgHold		TYP		
10 dB/div Log	Ref Offset 1 d Ref 18.00 d						М	kr1 15.0 -53.7	96 GHz 08 dBm	Auto Tune
8.00			2						<u>.</u>	Center Freq 12.00000000 GHz
-12.0										Start Freq 8.00000000 GHz
-22.0									-27.05 dBm	Stop Freq 16.00000000 GHz
-42.0								(1 W ^{han} mMaulae	CF Step 800.000000 MHz <u>Auto</u> Man
-62.0 <mark>21</mark> 1/10/10/10	mandenality	howingly providences	h/hhmehetmysted	<mark>↓↓₩↓₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩</mark>	_{คาเสร} างสารุโ ม	aftyy haven	upper and a second	Loged Markey and	AL. I ANIA JOINT	Freq Offset 0 Hz
-72.0 Start 8.00								Stop 16	.000 GHz	
#Res BW	100 kHz		#VBW	300 kHz			Sweep		1001 pts)	
Mag							STATUS			





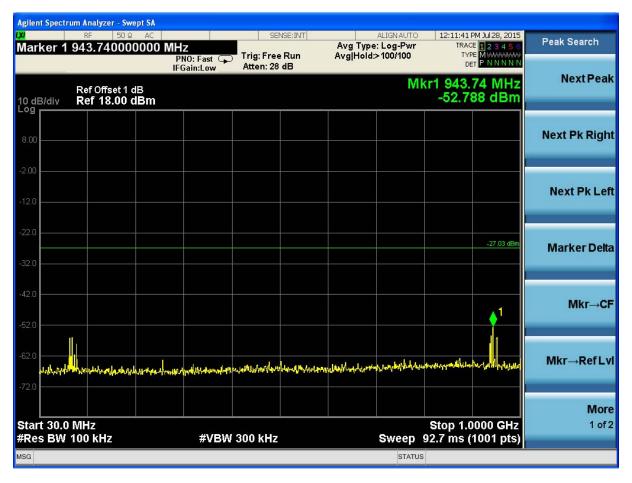
(Plot 4.7.1 B6: Channel 19: 2440MHz @ GFSK)

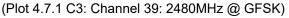
	RF 50 Ω AC		SENSE:II	ALIGNAUTO	12:11:03 PM Jul 28, 20	
enter Fr	eq 2.4800000	DO GHZ PNO: Wide IFGain:Low	Trig: Free Run Atten: 28 dB	rpe: Log-Pwr Id:>100/100	TRACE 1 2 3 4 5 TYPE MWWWW DET P N N N N	W N
0 dB/div	Ref Offset 1 dB Ref 18.00 dBm			Mkr1	2.479 970 GH -7.030 dBr	z Auto Tun
3.00						Center Fre 2.480000000 GH
2.0						Start Fre 2.479000000 G⊦
2.0					-27.03 dE	Stop Fre 2.481000000 GH
2.0						CF Ste 200.000 kł <u>Auto</u> Mi
2.0						Freq Offs 01
enter 2.4 Res BW 1	80000 GHz	#\/P\/	∮ 300 kHz	Swoon	Span 2.000 MH I.00 ms (1001 pts	
G	TOU KHZ	#VDV	F JUU KHZ	Sweep	1.00 ms (1001 pt	2

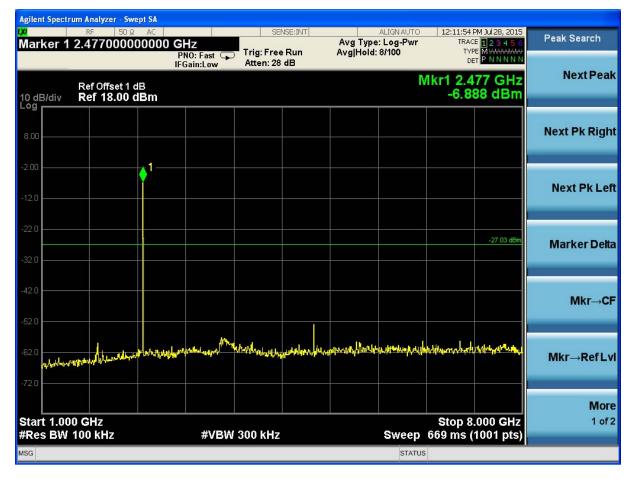




(Plot 4.7.1 C2: Channel 39: 2480MHz @ GFSK)







(Plot 4.7.1 C4: Channel 39: 2480MHz @ GFSK)

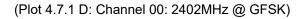
	gilent Spectrum Analyzer - Swept SA											
IXI Marke	or 1 1	RF 50 1	Ω ΑΟ	CH-	SE	NSE:INT		ALIGNAUTO		PM Jul 28, 2015	Peak Search	
Mali N		5.504000		PNO: Fast	Trig: Free Atten: 28		Avg Hold:		TYI			
	-			IFGain:Low	Atten. 20	uD		M	krd 45 3	04 GHz	Next Peak	
10 404		Ref Offset 1 Ref 18.00						IVI	-53.8	43 dBm		
10 dB/o	ulv									فللماد الشر		
											Next Pk Right	
8.00										<u>e</u>	NEAL FR RIGHT	
-2.00 —												
-2:00												
-12.0			2	4						C	Next Pk Left	
-22.0												
										-27.03 dBm	Marker Delta	
-32.0			<u></u>									
10.0												
-42.0 —											Mkr→CF	
-52.0 —										↓1	HARDEN TISS	
									while	4 Monthe Jan Wagel		
-62.0 📣	shipter and the	hand	wellow hally	zdĺljebeľ ¹ dovnetjik po	Martin Marthal	shiphyman shiphing	tellowing the	Hrung Hran and a sec			Mkr→RefLvl	
-72.0 —												
											More	
Start				1. (1997)				~	Stop 16	.000 GHz	1 of 2	
#Res	BW 1	00 kHz		#VBW	300 kHz			Sweep	765 ms (1001 pts)		
MSG								STATUS				

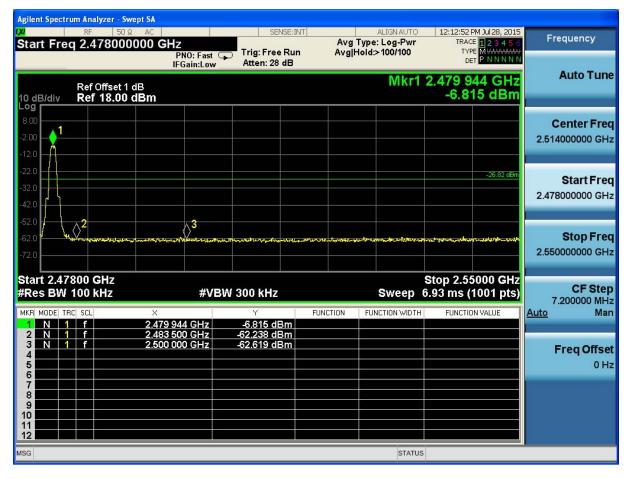
(Plot 4.7.1 C5: Channel 39: 2480MHz @ GFSK)



(Plot 4.7.1 C6: Channel 39: 2480MHz @ GFSK)

-	nt Spe	ctru		alyzer - Sw					1				
IXI Sta	rt F	rea	RF		2 AC 1000 GHz			NSE:INT		ALIGNAUTO Type: Log-Pwr	TRAC	PM Jul 28, 2015 E 1 2 3 4 5 6	Frequency
					P	PNO: Fast Gain:Low	Trig: Free Atten: 28		Avg H	lold:>100/100	DE		Auto Tune
	lB/div			Offset 1 18.00						Mkr1		24 GHz 98 dBm	Auto Tune
Log 8.00 -2.00 -12.0)												Center Freq 2.352000000 GHz
-22.0 -32.0 -42.0												-26.70 dBm	Start Freq 2.300000000 GHz
-52.0 -62.0 -72.0)	ኯኯፙ		anadd yn ar Llwy	a A sijketeglegerge	le _{ve a} rovaturika	مەرىيىلىرى مەرىيىكى بەرىيىلىكى بەرىيىكى بەرىيىكى بەرىيىكى بەرىيىكى بەرىيىكى بەرىيىكى بەرىيىكى بەرىيىكى بەرىيىك مەرىيىكى بەرىيىكى بەرى	այութութե, Ու, դրացՈւ		halden allen af professor for a de a	material and	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Stop Freq 2.404000000 GHz
	rt 2. es Bl					#VB	W 300 kHz					0400 GHz 1001 pts)	CF Step 10.400000 MHz
MKR	MODE	TRC	SCL		×		Y C COO -II		NCTION	FUNCTION WIDTH	FUNCTIO	IN VALUE	<u>Auto</u> Man
2	NN	1	f		2.402 02	00 GHz	-6.698 dl -62.256 dl	3m					
3456	_N	1			2.400 00	JU GHZ	-59.753 dl	3m					Freq Offset 0 Hz
7 8 9						2							2
10 11 12													
MSG										STATUS			





(Plot 4.7.1 E: Channel 39: 2480MHz @ GFSK)

4.8. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 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.

And according to FCC 47 CFR Section 15.247 (c), if 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 exceeds 6dBi.

Refer to statement below for compliance

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Measurement

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module.

Measurement parameters

Measurement parameter			
Detector:	Peak		
Sweep time:	Auto		
Resolution bandwidth:	1MHz		
Video bandwidth:	3MHz		
Trace-Mode:	Max hold		

Limits

FCC	IC			
Antenna Gain				
6 dBi				

Results

T _{nom}	V _{nom}	Lowest Channel 2402 MHz	Middle Channel 2440 MHz	Highest Channel 2480 MHz
	oower [dBm] GFSK modulation	-4.56	-4.78	-3.58
	ower [dBm] GFSK modulation	-6.20	-6.28	-4.67
	[dBi] ılated	-1.64	-1.50	-1.09
Measuremer	nt uncertainty	± 0.6 dB (cond.) / ± 2.56 dB (rad.)		

.....End of Report.....