FCC Part 15C
Measurement and Test Report

For

SHENZHEN JUNLAN ELECTRONIC LTD

No. 277 PingKui Road, Shijing Community, Pingshan

Street, Pingshan New District, Shenzhen, China

FCC ID: OKUSBB-61250

FCC Rule(s):	FCC Part 15.247
Product Description:	CH BLUETOOTH SOUNDBAR SPEAKER
Tested Model:	SBB-61250
Report No.:	HCT18AR016E-1
Sample Receipt Date:	2018-02-07
Tested Date:	2018-02-08 to 2018-02-27
Issued Date:	2018-02-28
Tested By:	Jason Su / Engineer
Reviewed By:	Silin Chen / EMC Manager
Approved & Authorized By:	Jandy So / PSQ Manager

Prepared By:

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	SHENZHEN JUNLAN ELECTRONIC LTD
Address of applicant:	No. 277 PingKui Road, Shijing Community, Pingshan Street, Pingshan New District, Shenzhen, China
Manufacturer:	SHENZHEN JUNLAN ELECTRONIC LTD
Address of manufacturer:	No. 277 PingKui Road, Shijing Community, Pingshan Street, Pingshan New District, Shenzhen, China

General Description of EUT	
Product Name:	CH BLUETOOTH SOUNDBAR SPEAKER
Trade Name:	NAXA
Model No.:	SBB-61250
Adding Model(s):	NHS-2012
Rated Voltage:	DC 5.8V
Power Adapter Model:	GKYPS0200058US1 Input:AC100-240V~50/60Hz, 0.5A Output:DC5.8V/2000mA
Note: The test data is gathered from a production sample provided by the manufacturer. The product names of others models listed in the report is different from main-test model SBB-61250, but the appearance and circuit and the electronic construction do not change, declared by the manufacturer.	

Technical Characteristics of EUT	
Bluetooth Version:	V4.0
Frequency Range:	2402-2480MHz
RF Output Power:	-5.967dBm (Conducted)
Data Rate:	1Mbps, 2Mbps, 3Mbps
Modulation:	GFSK, Pi/4 DQPSK, 8DPSK
Quantity of Channels:	79
Channel Separation:	1MHz
Type of Antenna:	PCB
Antenna Gain:	0 dBi
Lowest Internal Frequency of EUT:	24.576MHz

1.2 Test Standards

The following report is prepared on behalf of the SHENZHEN JUNLAN ELECTRONIC LTD in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

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

1.4 Test Facility

FCC – Registration No.: 125990

Shenzhen SEM Test Technology 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 and the Registration is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

CNAS Registration No.: L4062

Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101).

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	Low Channel	2402MHz
TM2	Middle Channel	2441MHz
TM3	High Channel	2480MHz
TM4	Hopping	2402-2480MHz

Modulation Configure			
Modulation	Packet	Packet Type	Packet Size
GFSK	DH1	4	27
	DH3	11	183
	DH5	15	339
Pi/4 DQPSK	2DH1	20	54
	2DH3	26	367
	2DH5	30	679
8DPSK	3DH1	24	83
	3DH3	27	552
	3DH5	31	1021
Normal mode: the Bluetooth has been tested on the modulation of GFSK, (Pi/4)DQPSK and 8DPSK, compliance test and record the worst case.			

Accessories Equipment List and Details			
Description	**Manufacturer**	**Model No.**	**Serial Number**
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
Accessories Cable List and Details			
Cable Description	**Length (m)**	**Shielded/Unshielded**	**With Core/Without Core**
/	/	/	/
/	/	/	/
/	/	/	/
EUT Cable List and Details			
Cable Description	**Length (m)**	**Shielded/Unshielded**	**With Core/Without Core**
DC Cable	1.5	Shielded	Without Core
AUX Cable	1.0	Shielded	Without Core
Audio Cable	1.2	Shielded	Without Core

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	±0.42dB
Occupied Bandwidth	Conducted	±1.5%
Conducted Spurious Emission	Conducted	±2.17dB
Conducted Emissions	Conducted	±2.88dB
Transmitter Spurious Emissions	Radiated	±5.1dB

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2017-06-12	2018-06-11
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2017-06-12	2018-06-11
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2017-06-12	2018-06-11
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2017-06-12	2018-06-11
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2017-06-12	2018-06-11
SEMT-1011	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2017-06-12	2018-06-11
SEMT-1042	Horn Antenna	ETS	3117	00086197	2017-06-12	2018-06-11
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2017-06-12	2018-06-11
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2017-06-12	2018-06-11
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2017-06-12	2018-06-11
SEMT-1003	L.I.S.N	Schwarz beck	NSLK8126	8126-224	2017-06-12	2018-06-11
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2017-06-12	2018-06-11

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 2.1091	RF Exposure	Compliant
§ 15.203; § 15.247(b)(4)(i)	Antenna Requirement	Compliant
§15.205	Restricted Band of Operation	Compliant
§ 15.207(a)	Conducted Emission	Compliant
§ 15.209(a)	Radiated Spurious Emissions	Compliant
§ 15.247(a)(1)(iii)	Quantity of Hopping Channel	Compliant
§ 15.247(a)(1)	Channel Separation	Compliant
§ 15.247(a)(1)(iii)	Time of Occupancy (Dwell time)	Compliant
§ 15.247(a)	20dB Bandwidth	Compliant
§ 15.247(b)(1)	RF Power Output	Compliant
§ 15.247(d)	Band Edge (Out of Band Emissions)	Compliant
§ 15.247(a)(1)	Frequency Hopping Sequence	Compliant
§ 15.247(g), (h)	Frequency Hopping System	Compliant

N/A: not applicable

3. RF Exposure

3.1 Standard Applicable

According to § 1.1307 and § 2.1091, the mobile transmitter must comply the RF exposure requirements.

3.2 Test Result

This product complied with the requirement of the RF exposure, please see the RF Exposure Report.

4. Antenna Requirement

4.1 Standard Applicable

According to FCC Part 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.

4.2 Evaluation Information

This product has an PCB antenna, fulfill the requirement of this section.

5. Frequency Hopping System Requirements

5.1 Standard Applicable

According to FCC Part 15.247(a)(1), The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

(g) Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

(h) The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

5.2 Frequency Hopping System

This transmitter device is frequency hopping device, and complies with FCC part 15.247 rule.

This device uses Bluetooth radio which operates in 2400-2483.5 MHz band. Bluetooth uses a radio technology called frequency-hopping spread spectrum, which chops up the data being sent and transmits chunks of it on up to 79 bands (1 MHz each; centred from 2402 to 2480 MHz) in the range 2,400-2,483.5 MHz. The transmitter switches hop frequencies 1,600 times per second to assure a high degree of data security. All Bluetooth devices participating in a given piconet are synchronized to the frequency-hopping channel for the piconet. The frequency hopping sequence is determined by the master's device address and the phase of the hopping sequence (the frequency to hop at a specific time) is determined by the master's internal clock. Therefore, all slaves in a piconet must know the master's device address and must synchronize their clocks with the master's clock.

Adaptive Frequency Hopping (AFH) was introduced in the Bluetooth specification to provide an effective way for a Bluetooth radio to counteract normal interference. AFH identifies "bad" channels, where either other wireless devices are interfering with the Bluetooth signal or the Bluetooth signal is interfering with another device. The AFH-enabled Bluetooth device will then communicate with other devices within its piconet to share details of any identified bad channels. The devices will then switch to alternative available "good" channels, away from the areas of interference, thus having no impact on the bandwidth used.

This device was tested with an bluetooth system receiver to check that the device maintained hopping synchronization, and the device complied with these requirements for DA 00-705 and FCC Part 15.247 rule.

5.3 EUT Pseudorandom Frequency Hopping Sequence

Pseudorandom Frequency Hopping Sequence Table as below:
Channel: 08, 24, 40, 56, 40, 56, 72, 09, 01, 09, 33, 41, 33, 41, 65, 73, 53, 69, 06, 22, 04, 20, 36, 52, 38, 46, 70, 78, 68, 76, 21, 29, 10, 26, 42, 58, 44, 60, 76, 13, 03, 11, 35, 43, 37, 45, 69, 77, 55, 71, 08, 24, 08, 24, 40, 56, 40, 48, 72, 01, 72, 01, 25, 33, 12, 28, 44, 60, 42, 58, 74, 11, 05, 13, 37, 45 etc.

The system receiver have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

6. Quantity of Hopping Channels and Channel Separation

6.1 Standard Applicable

According to FCC 15.247(a)(1), frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, and frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

6.2 Test Procedure

According to ANSI C63.10-2013 section 7.8.3, the number of hopping frequencies test method as follows.

a) Span: The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
b) RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
c) VBW ⩾ RBW.
d) Sweep: Auto.
e) Detector function: Peak.
f) Trace: Max hold.
g) Allow the trace to stabilize.

According to ANSI C63.10-2013 section 7.8.2, the EUT shall have its hopping function enabled, the Carrier frequency separation test method as follows:

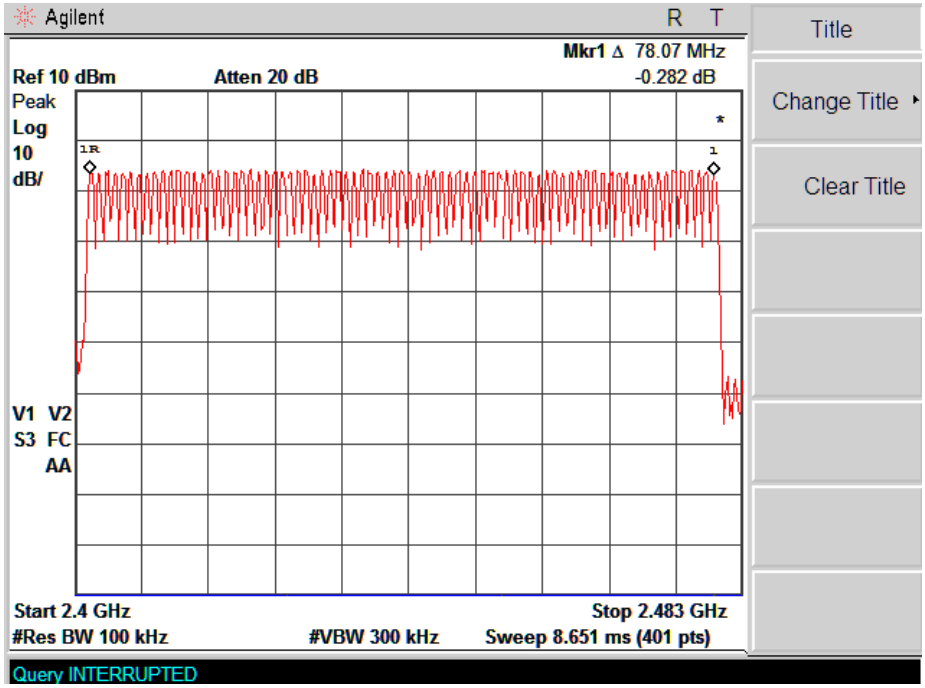
a) Span: Wide enough to capture the peaks of two adjacent channels.
b) RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.
c) Video (or average) bandwidth (VBW) ⩾ RBW.
d) Sweep: Auto.
e) Detector function: Peak.
f) Trace: Max hold.
g) Allow the trace to stabilize.
Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

6.3 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

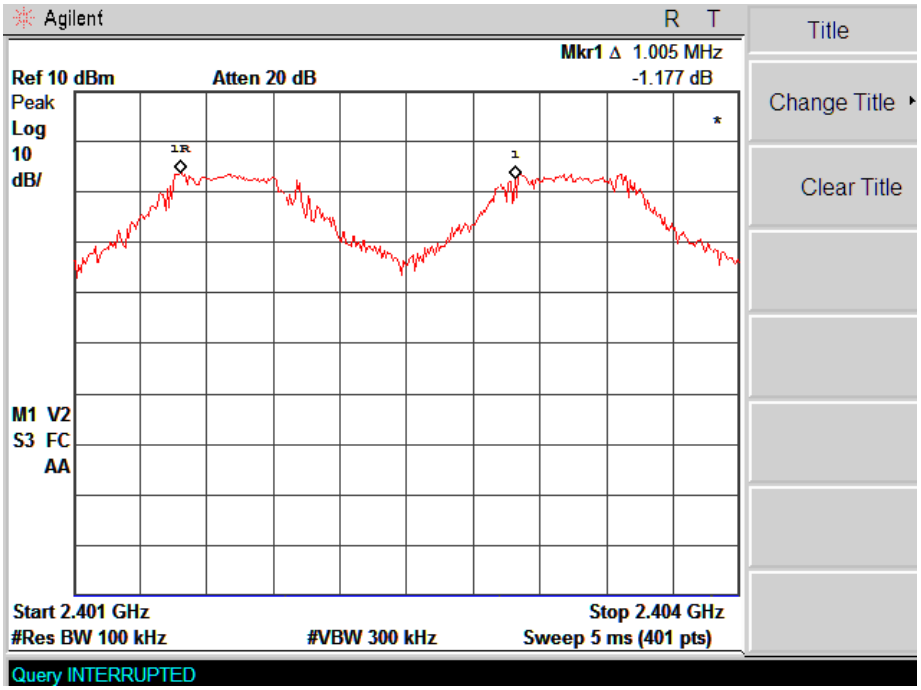
6.4 Summary of Test Results/Plots

No. of Channel = 79

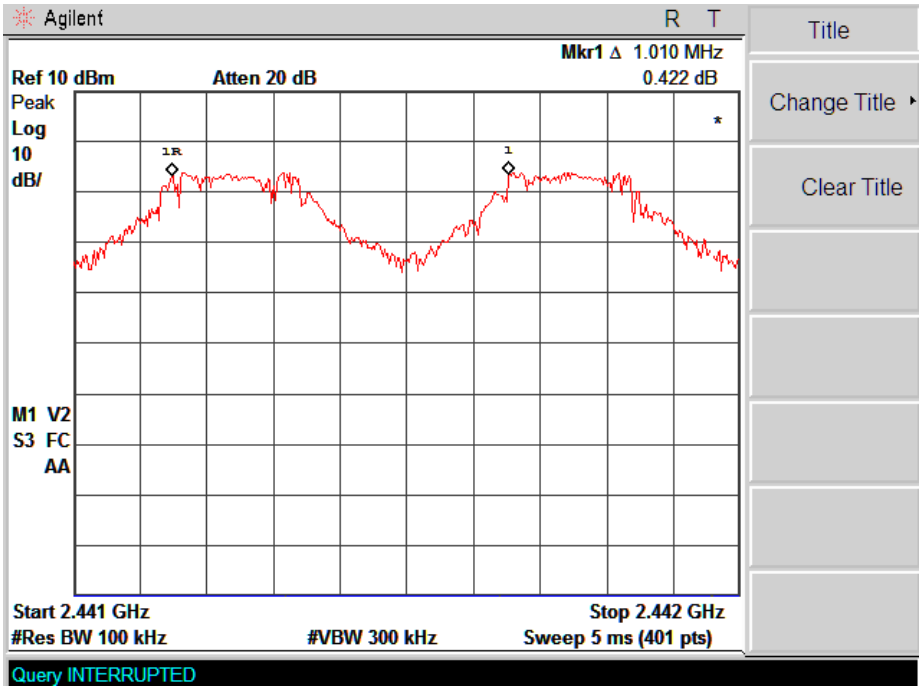


For GFSK mode

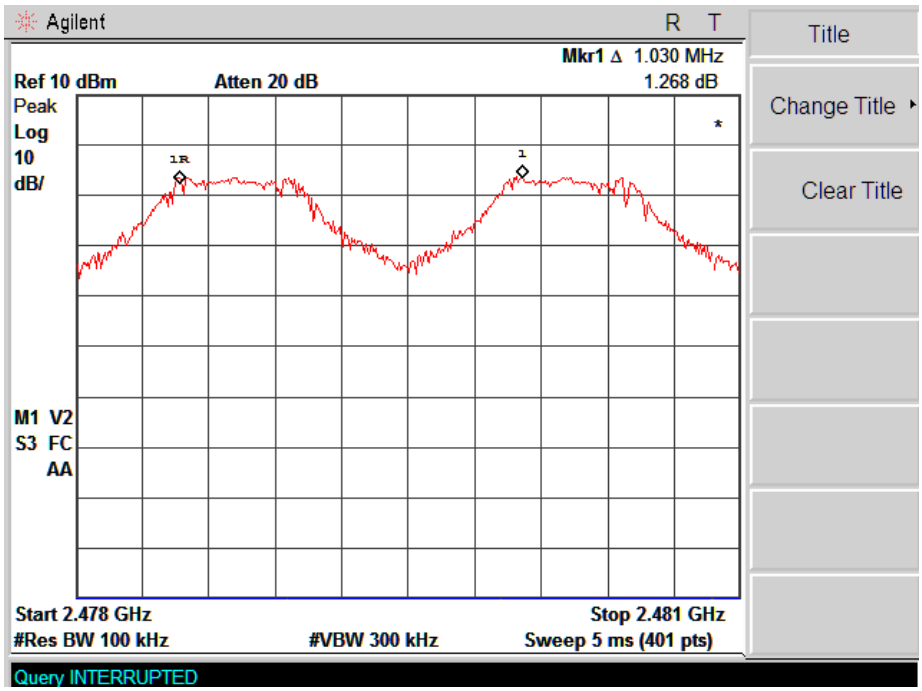
Channel Spacing (Low CH)



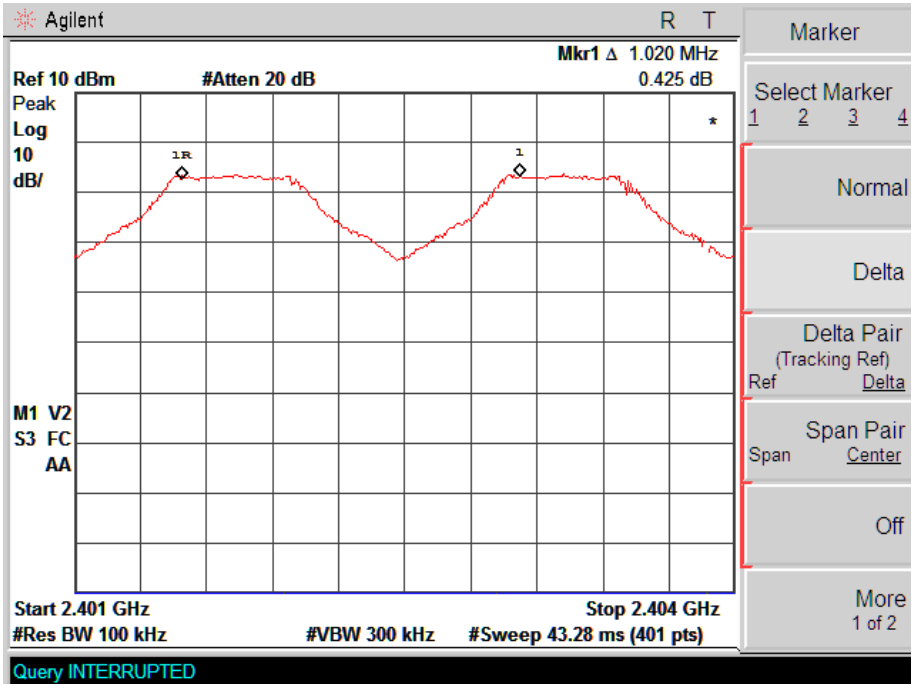
Channel Spacing (Middle CH)



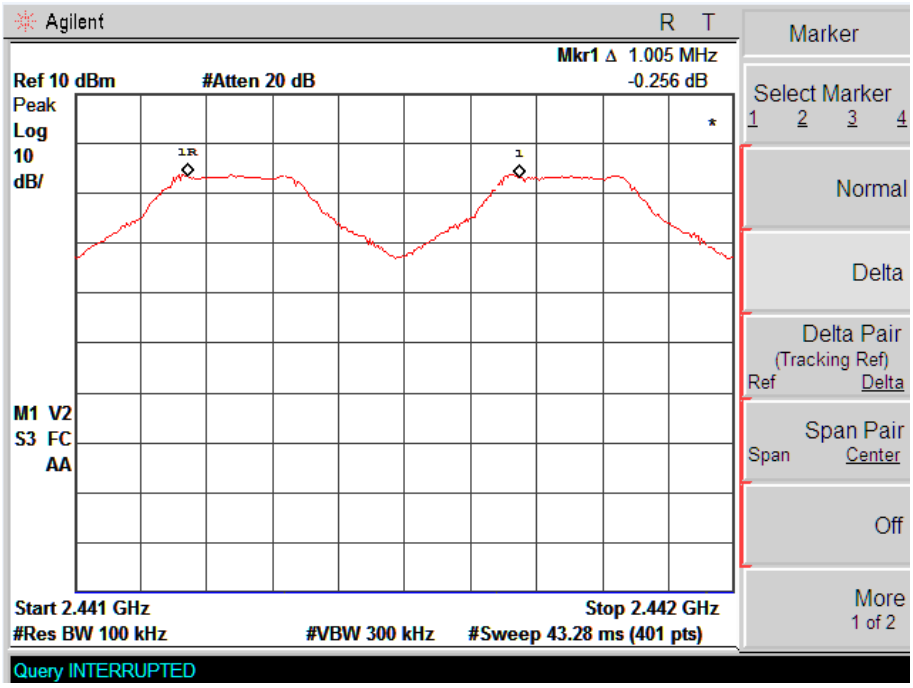
Channel Spacing (High CH)



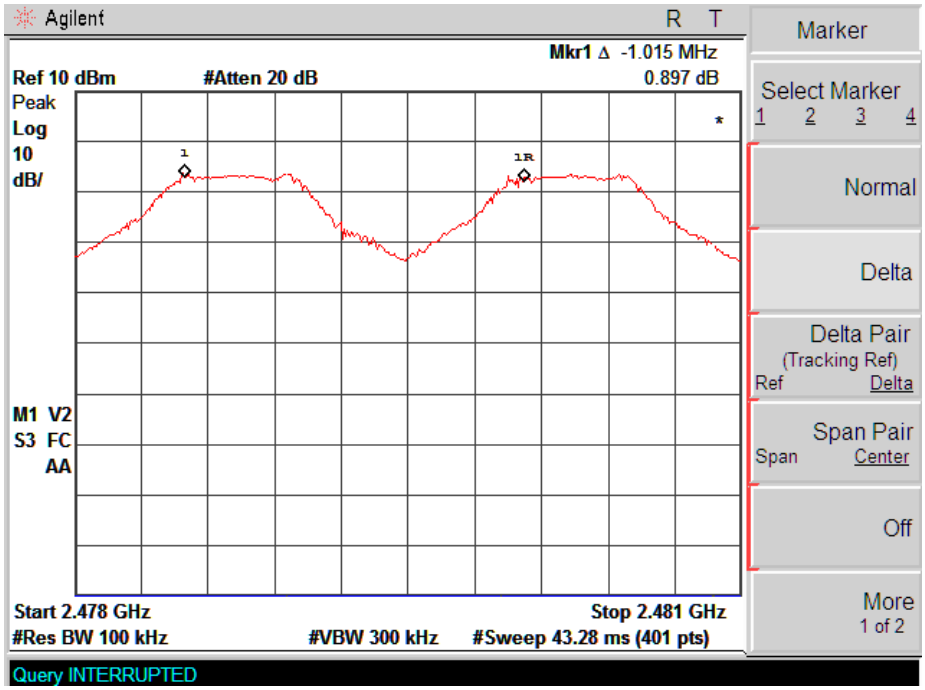
For pi/4 DQPSK mode
Channel Spacing (Low CH)



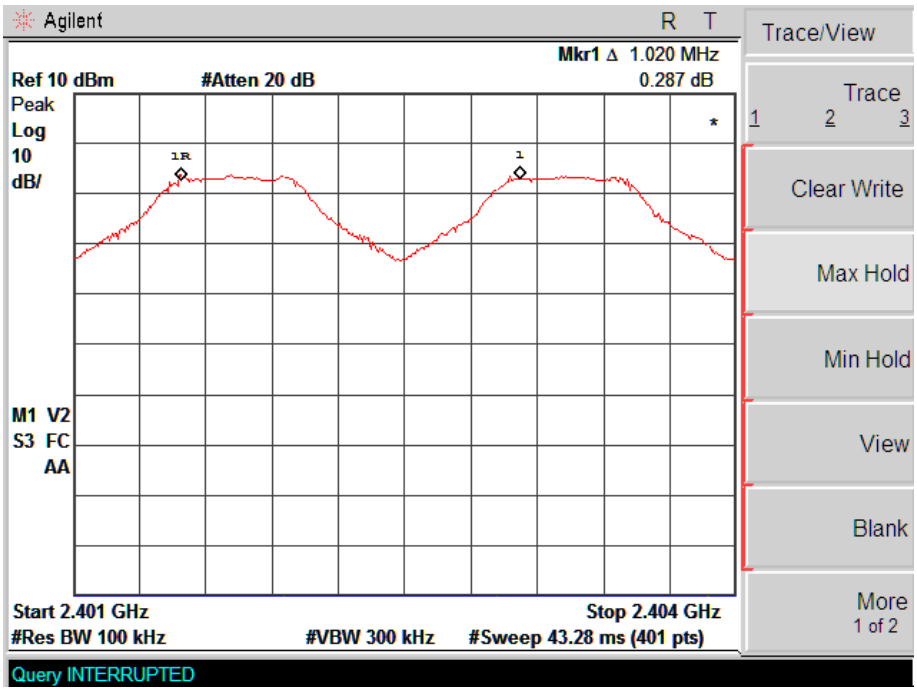
Channel Spacing (Middle CH)



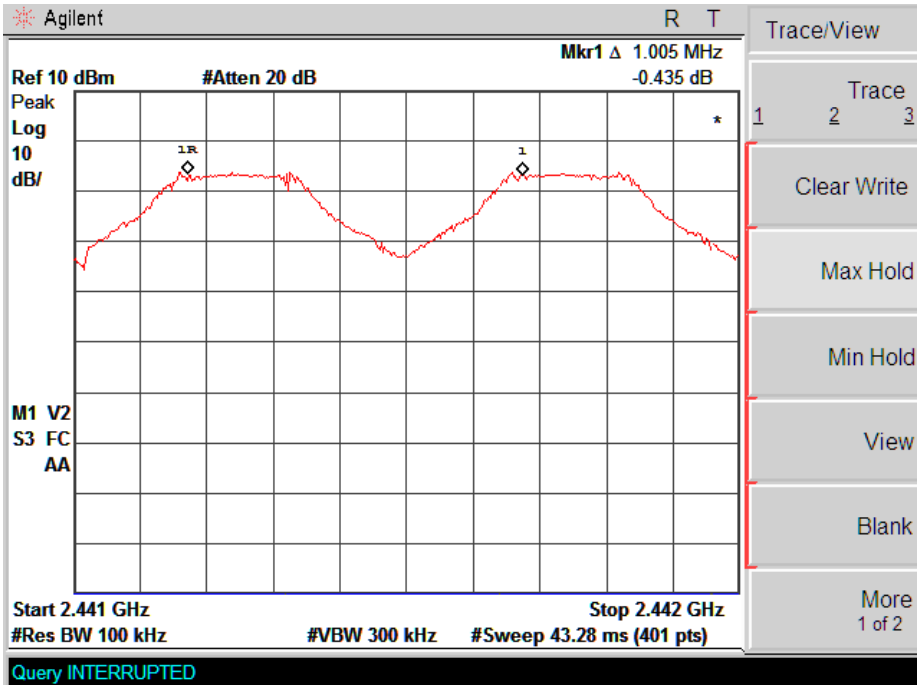
Channel Spacing (High CH)



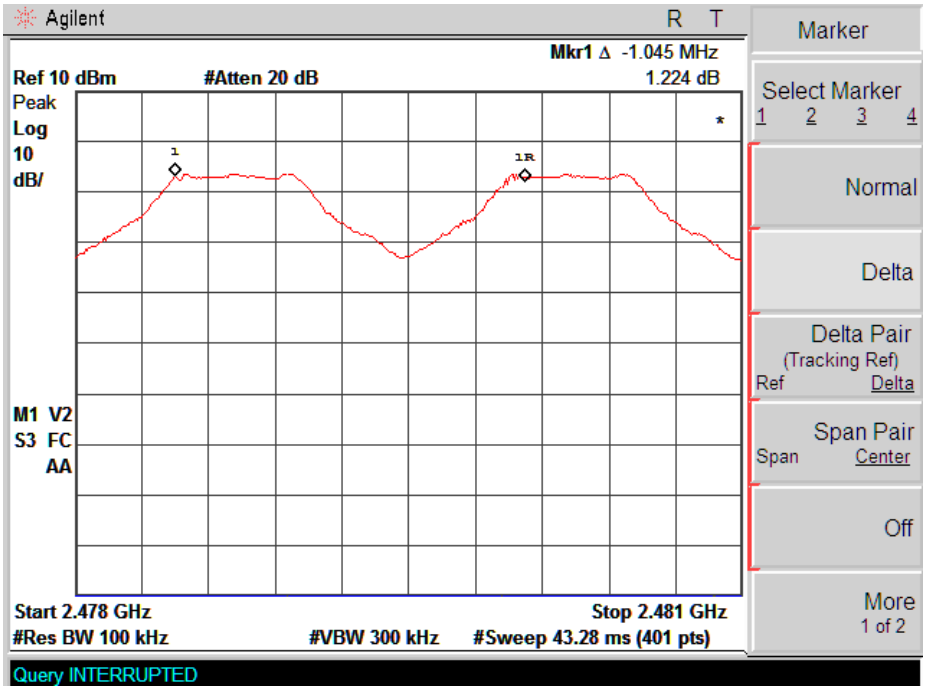
For 8DPSK mode
Channel Spacing (Low CH)



Channel Spacing (Middle CH)



Channel Spacing (High CH)



7. Dwell Time of Hopping Channel

7.1 Standard Applicable

According to 15.247(a)(1)(iii), Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

7.2 Test Procedure

According to ANSI C63.10-2013 section 7.8.4, the dwell time of a hopping channel test method as follows.

a) Span: Zero span, centered on a hopping channel.
b) RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.
c) Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start
of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.
d) Detector function: Peak.
e) Trace: Max hold.

Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time.
Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements. Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation:
(Number of hops in the period specified in the requirements) =
(number of hops on spectrum analyzer) × (period specified in the requirements / analyzer sweep time)
The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements. If the number of hops in a specific time varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation.
The measured transmit time and time between hops shall be consistent with the values described in the operational description for the EUT.

7.3 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

7.4 Summary of Test Results/Plots

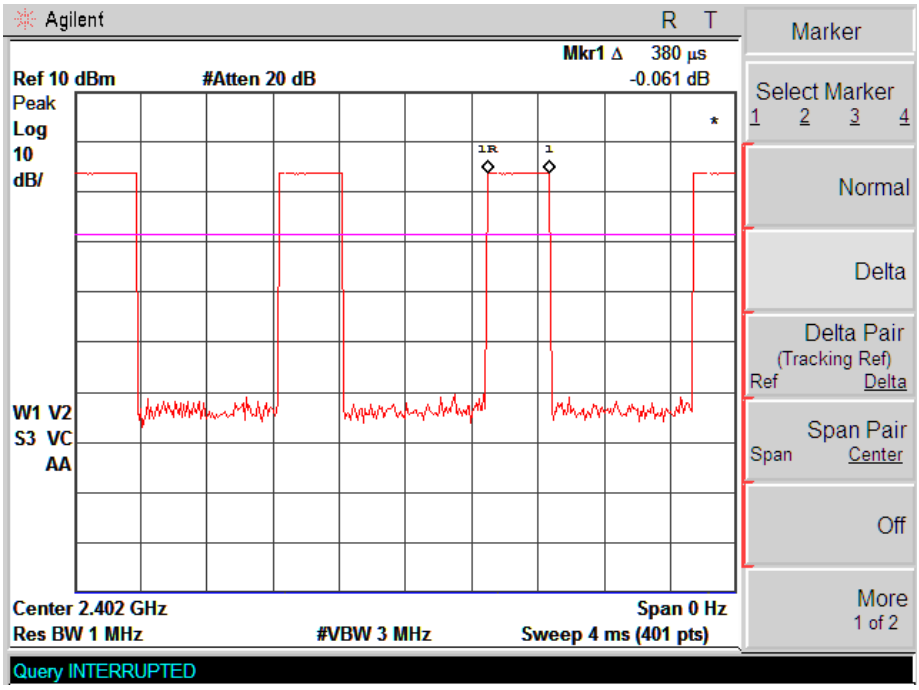
The dwell time within a period in data mode is independent from the packet type (packet length).

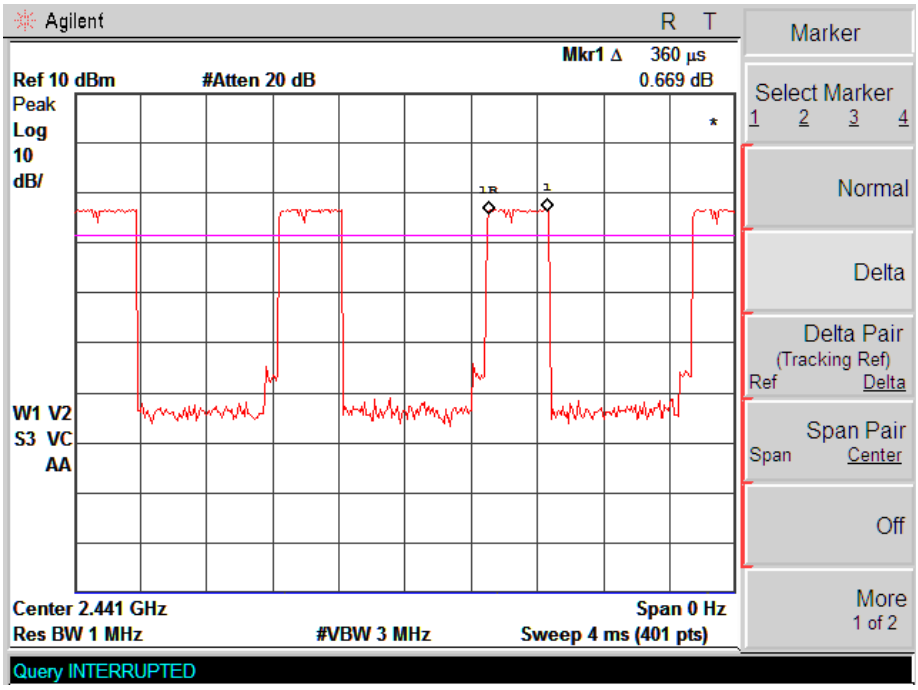
The test period: T = 0.4 Second * 79 Channel = 31.6 s
Dwell time (DH1) = time slot length * (1600 / 2 / 79) * 31.6
Dwell time (DH3) = time slot length * (1600 / 4 / 79) * 31.6
Dwell time (DH5) = time slot length * (1600 / 6 / 79) * 31.6

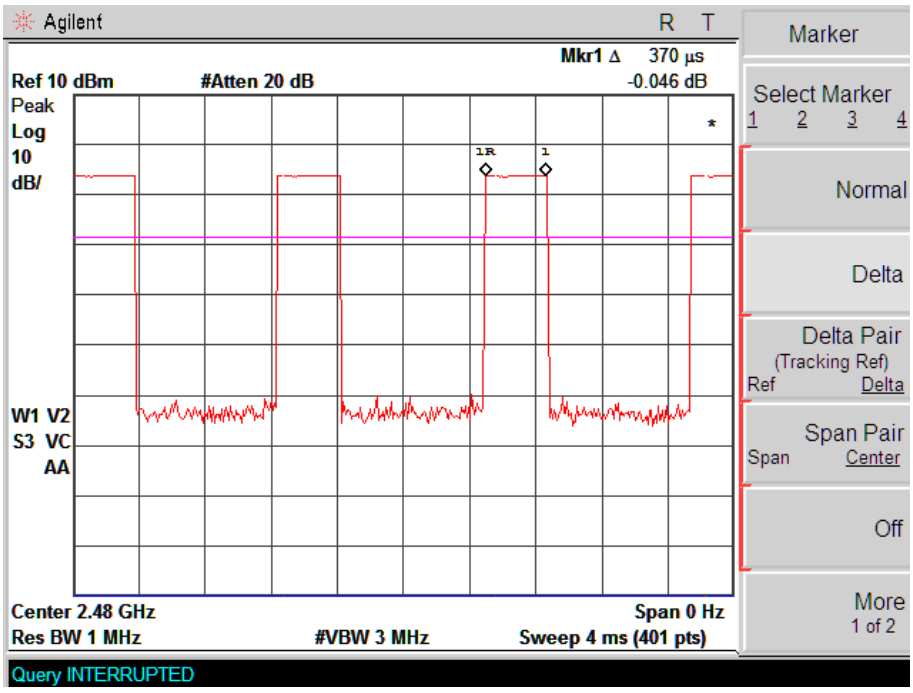
Modulation	Test Channel	Packet	Time Slot Length	Dwell Time	Limit
			ms	ms	ms
GFSK	2402MHz	DH1	0.380	121.6	400
		DH3	1.63	260.8	400
		DH5	2.87	306.1	400
	2441MHz	DH1	0.360	115.2	400
		DH3	1.62	259.2	400
		DH5	2.87	306.1	400
	2480MHz	DH1	0.370	118.4	400
		DH3	1.61	257.6	400
		DH5	2.86	305.1	400
pi/4-DQPSK	2402MHz	2DH1	0.380	121.6	400
		2DH3	1.63	260.8	400
		2DH5	2.87	306.1	400
	2441MHz	2DH1	0.380	121.6	400
		2DH3	1.63	260.8	400
		2DH5	2.87	306.1	400
	2480MHz	2DH1	0.380	121.6	400
		2DH3	1.63	260.8	400
		2DH5	2.87	306.1	400
8DPSK	2402MHz	3DH1	0.380	121.6	400
		3DH3	1.63	260.8	400
		3DH5	2.87	306.1	400
	2441MHz	3DH1	0.380	121.6	400
		3DH3	1.63	260.8	400
		3DH5	2.87	306.1	400
	2480MHz	3DH1	0.380	121.6	400
		3DH3	1.63	260.8	400
		3DH5	2.87	306.1	400

Please refer to the test plots as below:

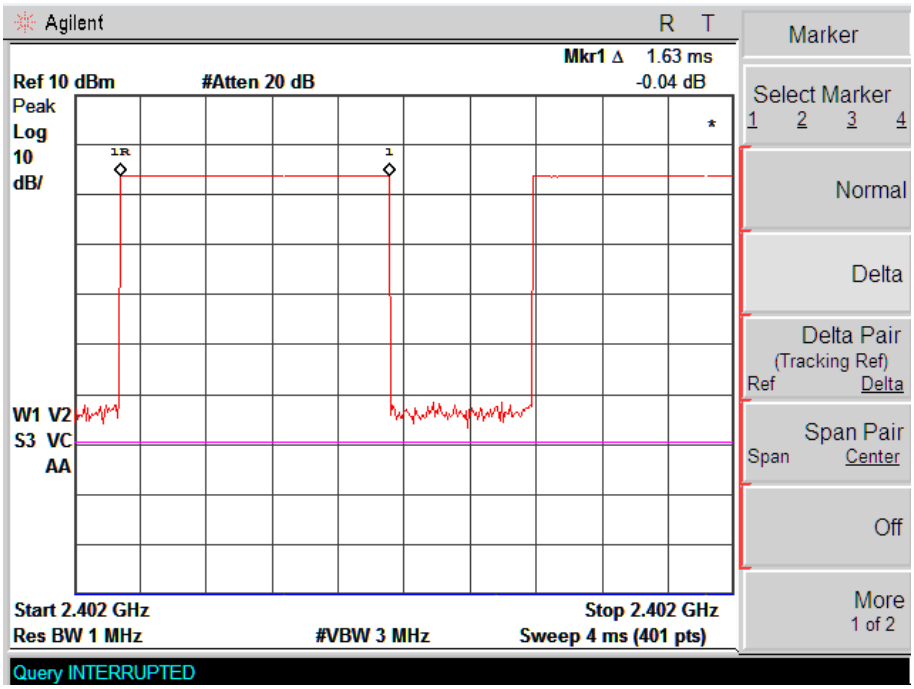
GFSK DH1 time slot (Low, Middle, High Channels)

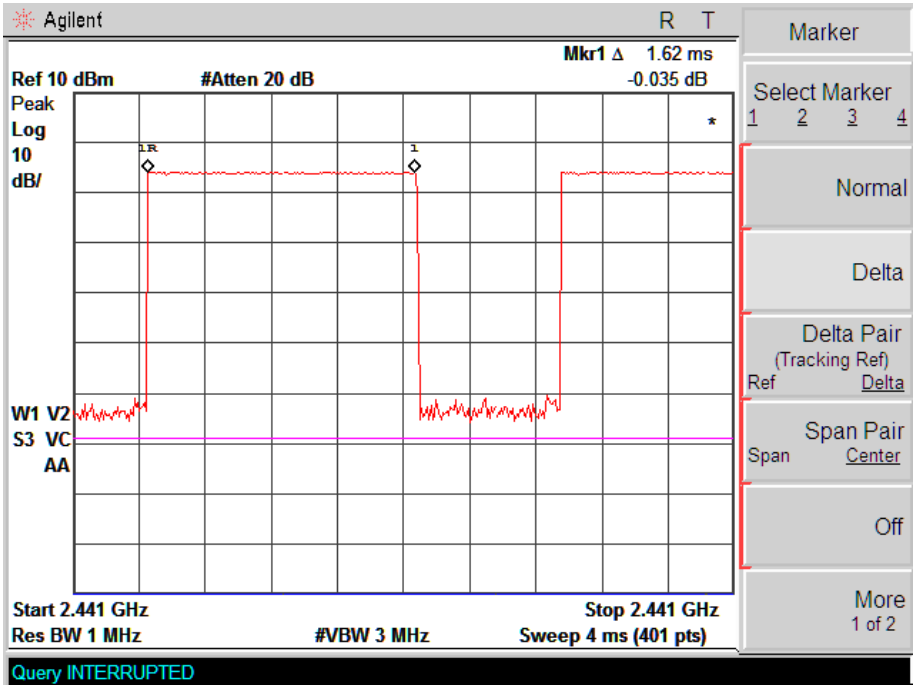


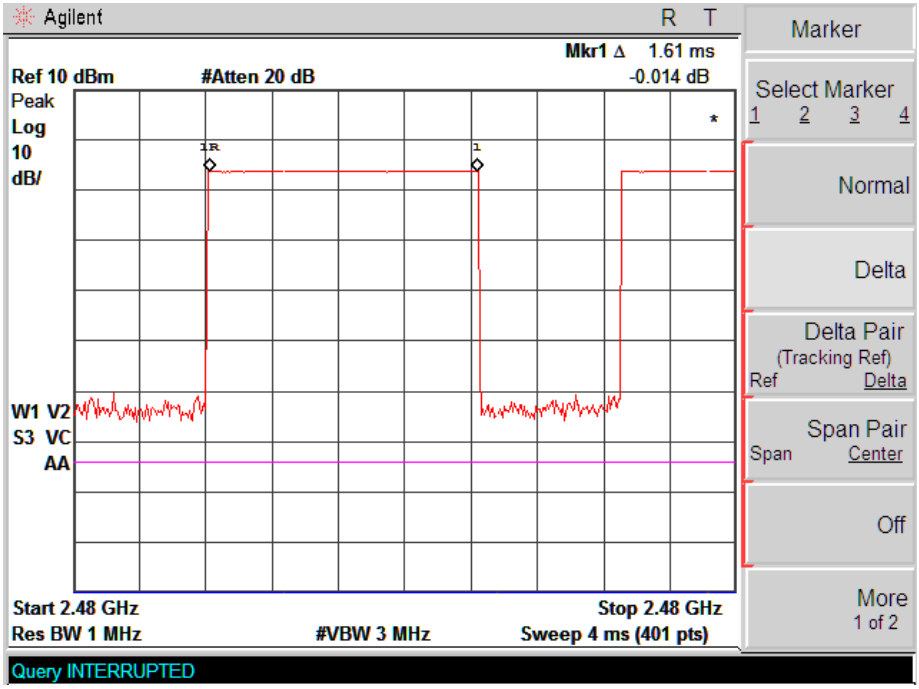




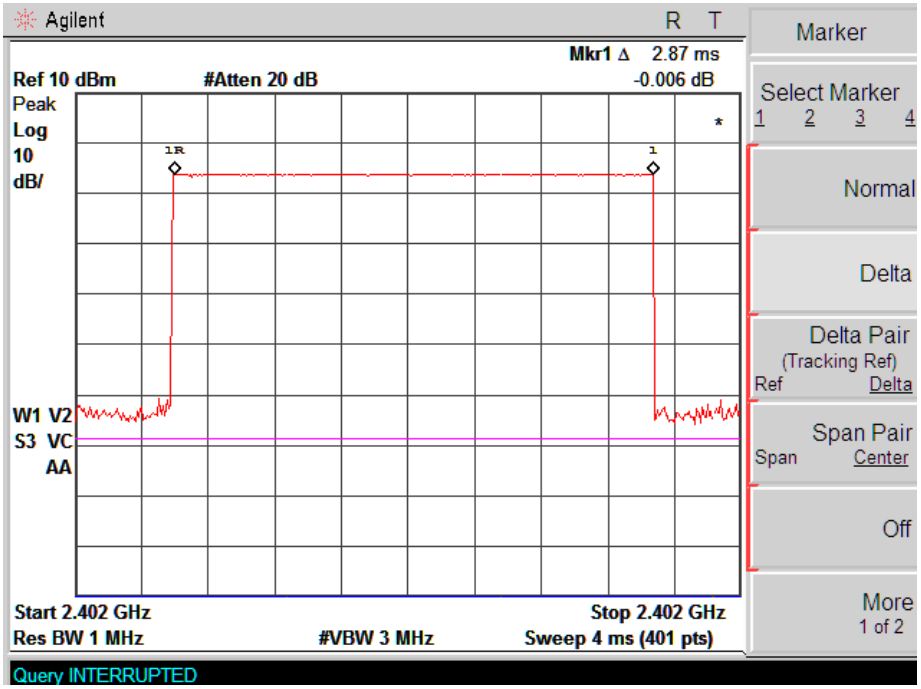
GFSK DH3 time slot (Low, Middle, High Channels)

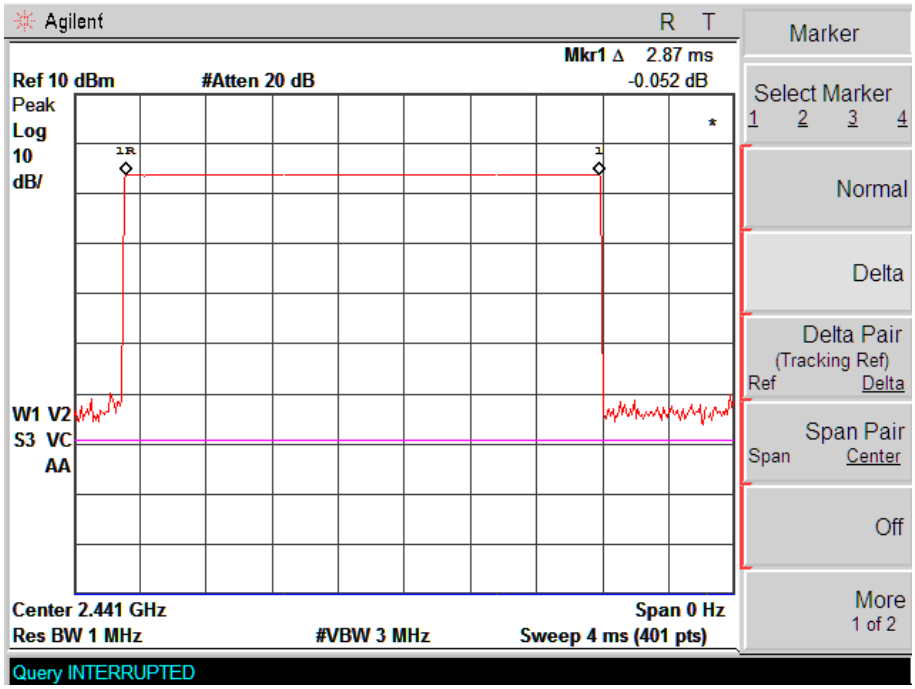


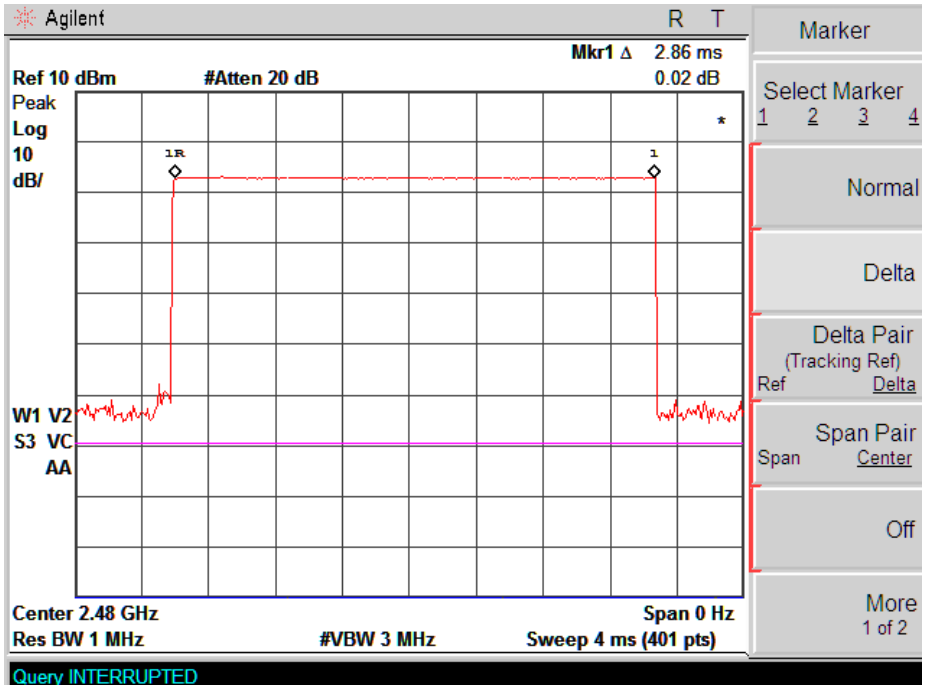

Agilent
R T
Marker
Mkr1 Δ 1.62 ms
-0.035 dB
Ref 10 dBm
#Atten 20 dB
Peak
Log
10
dB/
1R
1
W1 V2
S3 VC
AA
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2
Start 2.441 GHz
Res BW 1 MHz
#VBW 3 MHz
Stop 2.441 GHz
Sweep 4 ms (401 pts)
Query INTERRUPTED


Agilent
R T
Marker
Mkr1 Δ 1.61 ms
-0.014 dB
Ref 10 dBm
#Atten 20 dB
Peak
Log
10
dB/
1R
1
W1 V2
S3 VC
AA
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2
Start 2.48 GHz
Res BW 1 MHz
#VBW 3 MHz
Stop 2.48 GHz
Sweep 4 ms (401 pts)
Query INTERRUPTED

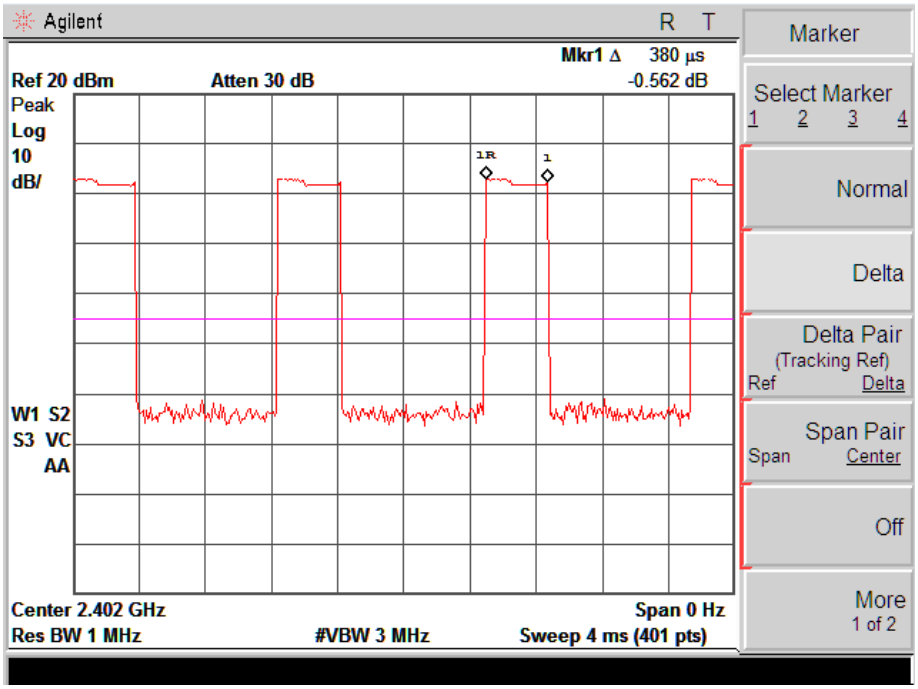
GFSK DH5 time slot (Low, Middle, High Channels)

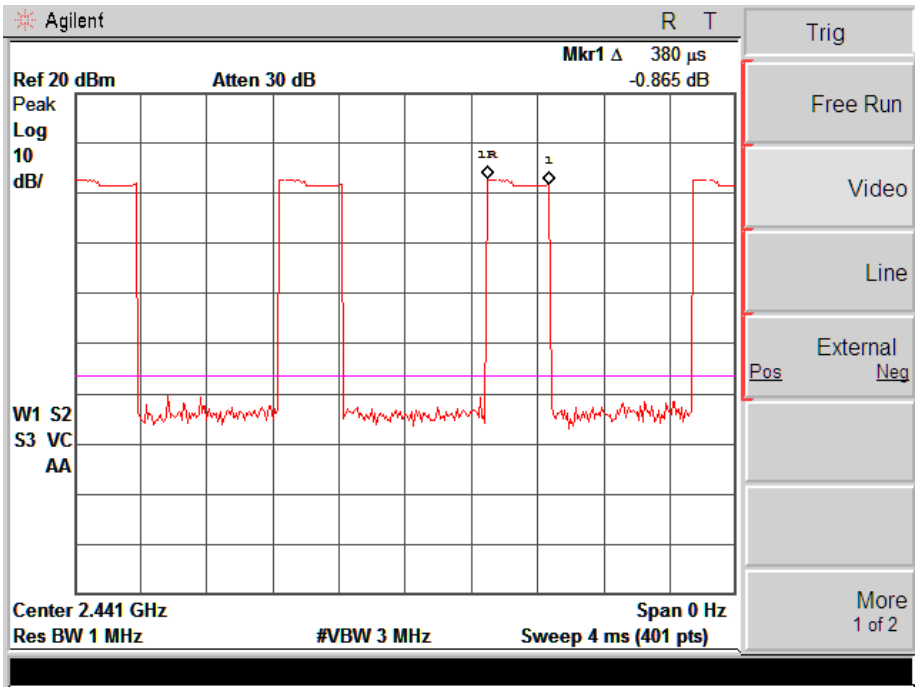


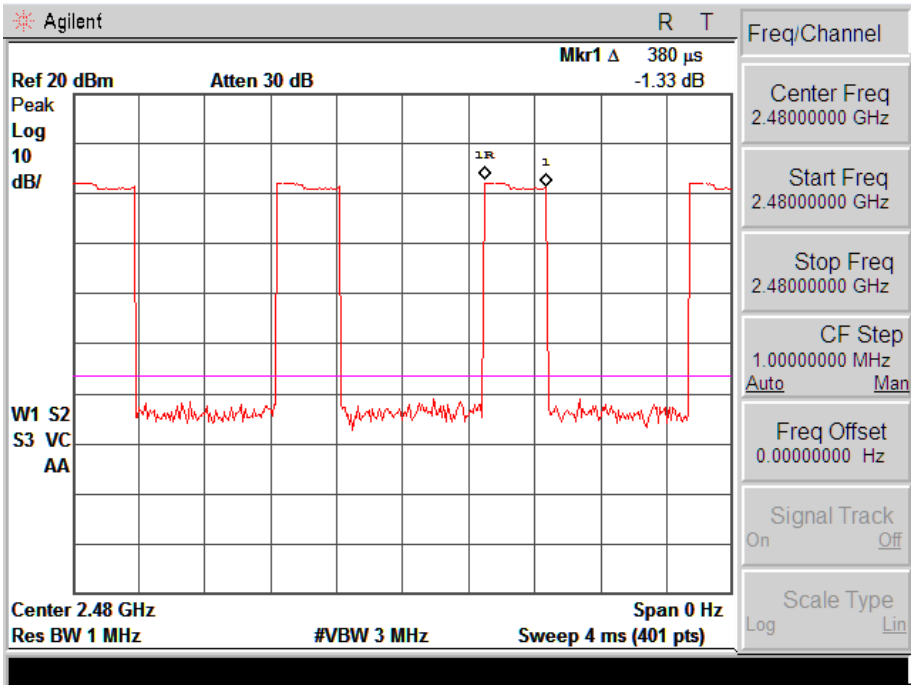




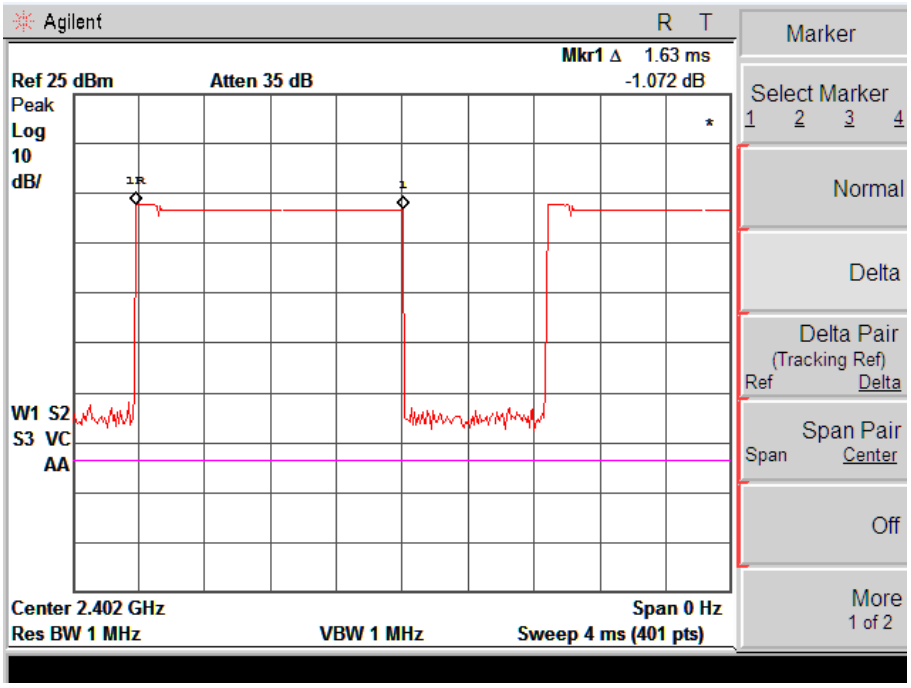
Pi/4 DQPSK 2DH1 time slot (Low, Middle, High Channels)

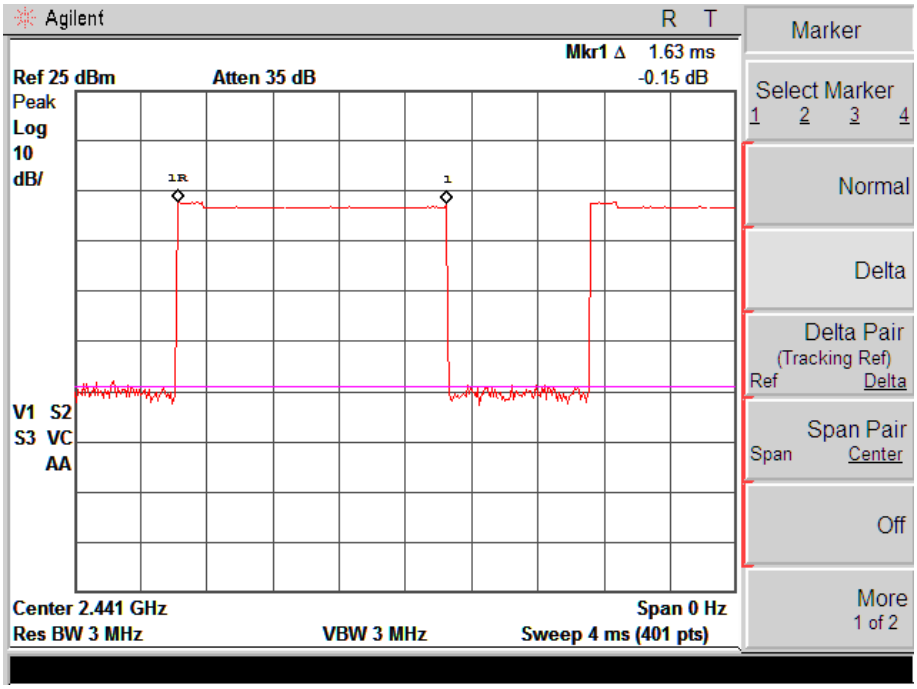


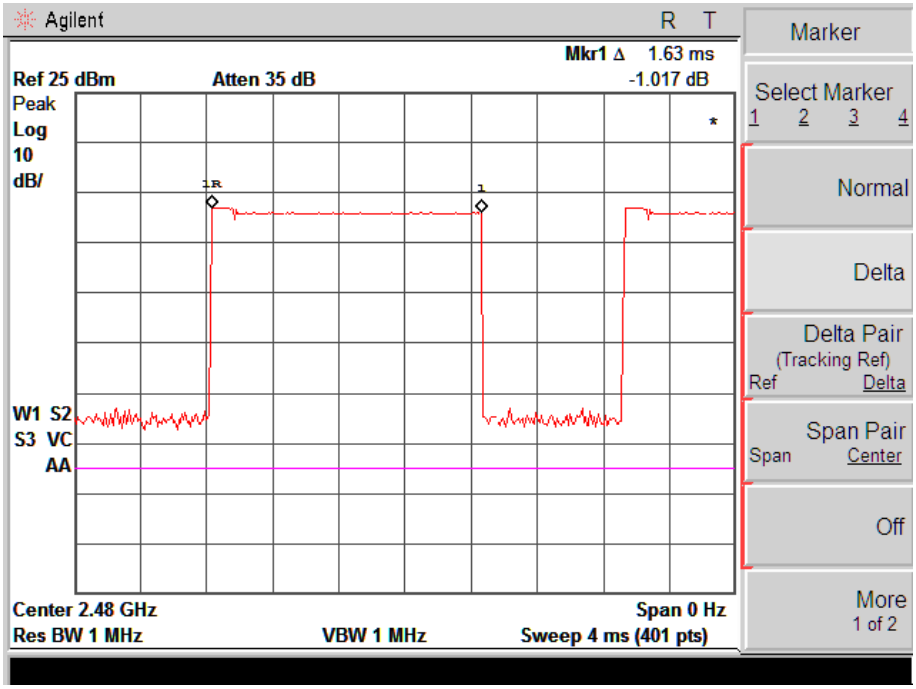

Agilent
R T
Mkr1 Δ 380 µs
-0.865 dB
Ref 20 dBm
Atten 30 dB
Peak
Log
10
dB/
1R
1
W1 S2
S3 VC
AA
Center 2.441 GHz
Res BW 1 MHz
#VBW 3 MHz
Span 0 Hz
Sweep 4 ms (401 pts)
Trig
Free Run
Video
Line
External
Pos
Neg
More
1 of 2


Agilent
R T
Mkr1 Δ 380 µs
-1.33 dB
Ref 20 dBm
Atten 30 dB
Peak
Log
10
dB/
1R
1
W1 S2
S3 VC
AA
Center 2.48 GHz
Res BW 1 MHz
#VBW 3 MHz
Span 0 Hz
Sweep 4 ms (401 pts)
Freq/Channel
Center Freq
2.48000000 GHz
Start Freq
2.48000000 GHz
Stop Freq
2.48000000 GHz
CF Step
1.00000000 MHz
Auto
Man
Freq Offset
0.00000000 Hz
Signal Track
On
Off
Scale Type
Log
Lin

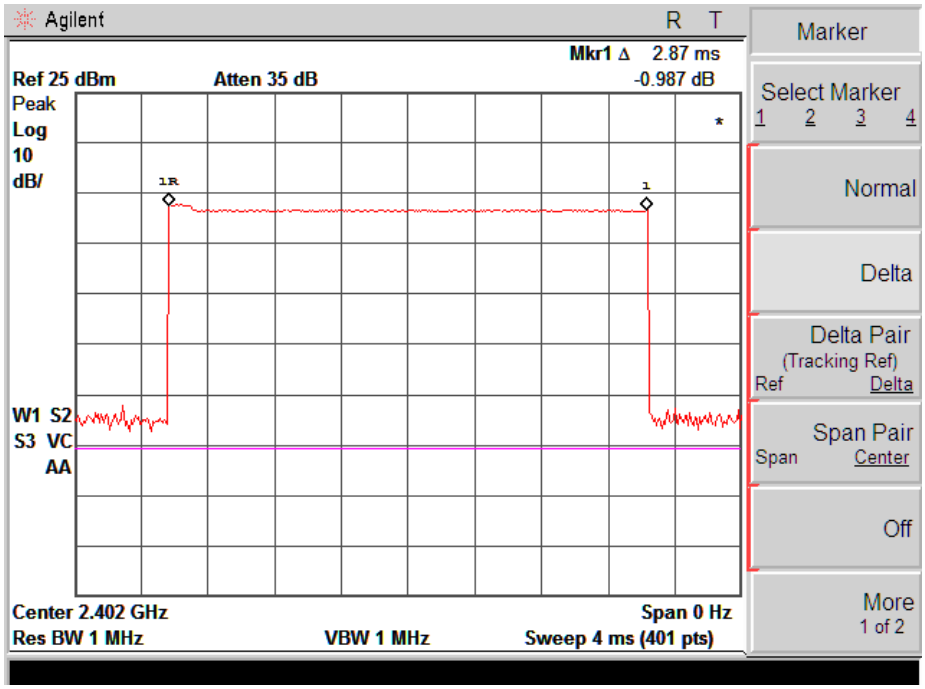
Pi/4 DQPSK 2DH3 time slot (Low, Middle, High Channels)

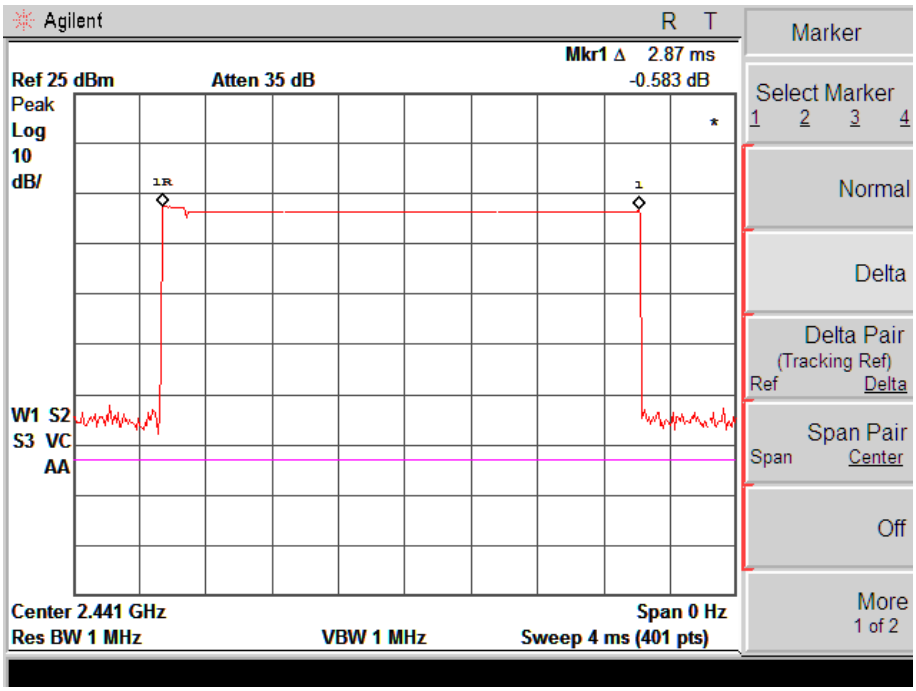


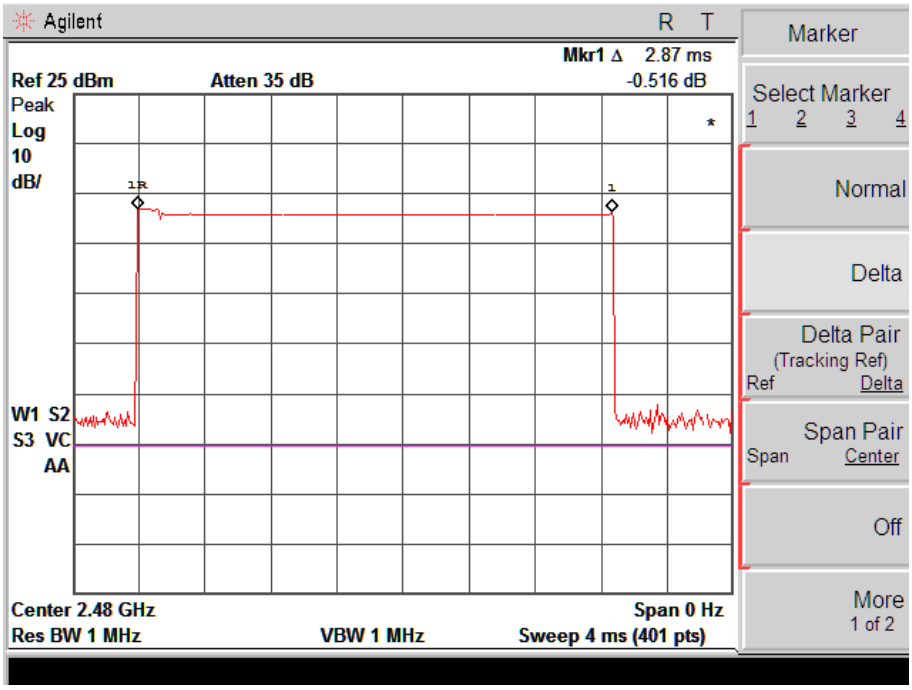




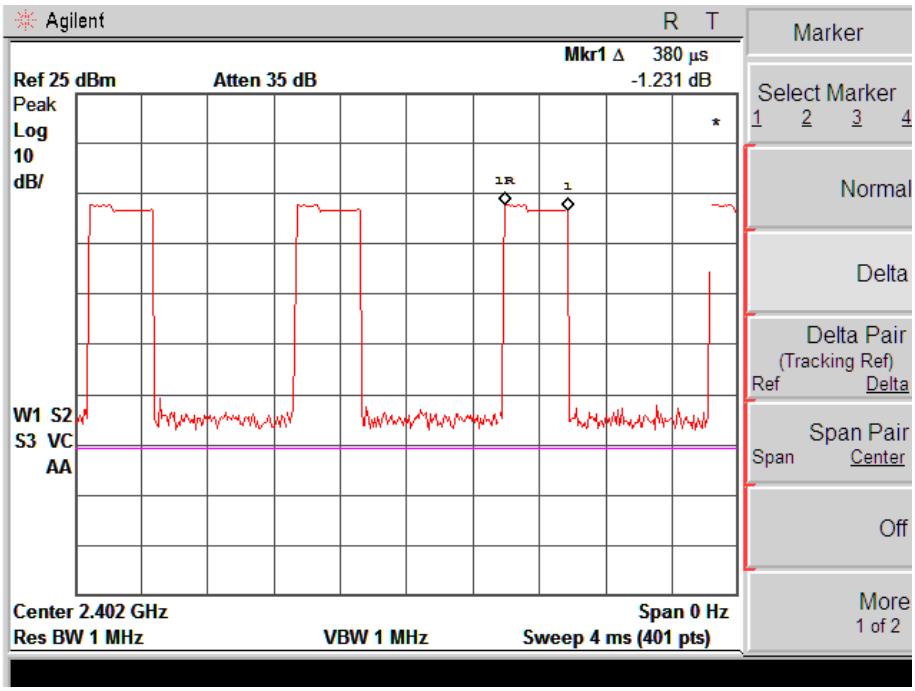
Pi/4 DQPSK 2DH5 time slot (Low, Middle, High Channels)

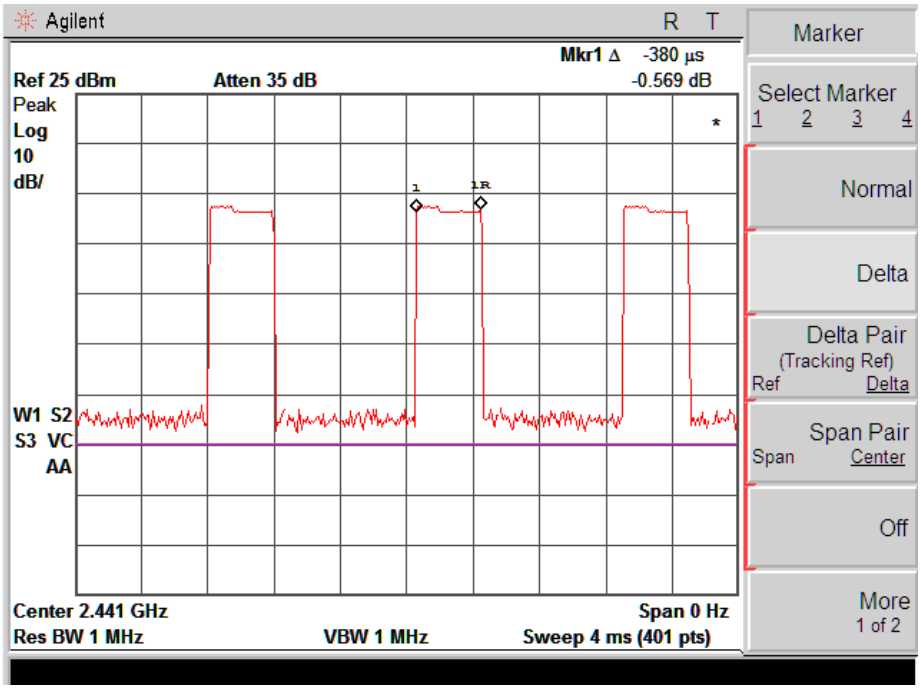


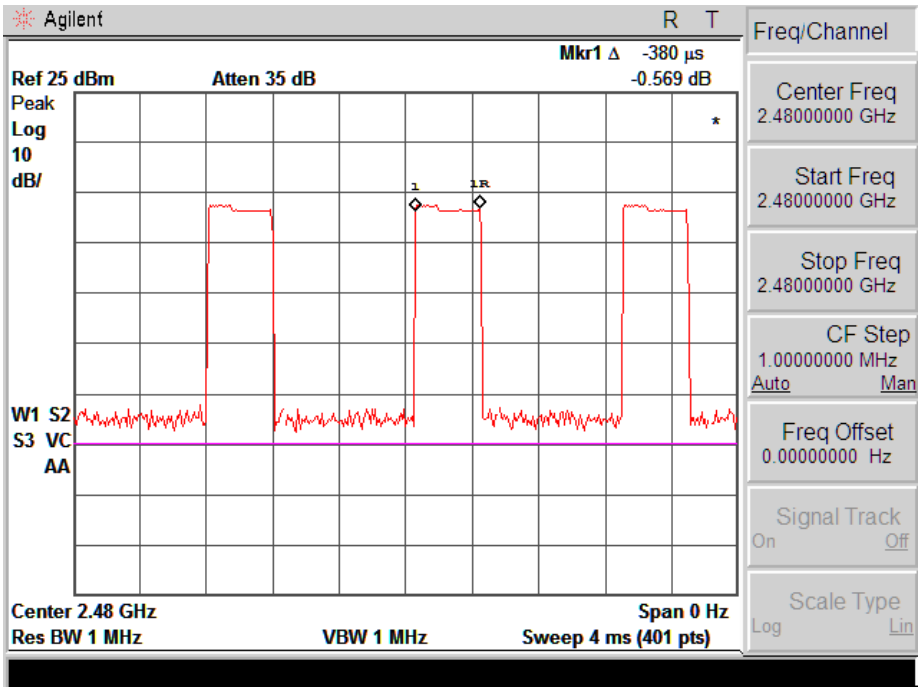

Agilent
R T
Mkr1 Δ 2.87 ms
-0.583 dB
Ref 25 dBm
Atten 35 dB
Peak
Log
10
dB/
1R
1
W1 S2
S3 VC
AA
Center 2.441 GHz
Res BW 1 MHz
VBW 1 MHz
Span 0 Hz
Sweep 4 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2


Agilent
R T
Mkr1 Δ 2.87 ms
-0.516 dB
Ref 25 dBm
Atten 35 dB
Peak
Log
10
dB/
1R
1
W1 S2
S3 VC
AA
Center 2.48 GHz
Res BW 1 MHz
VBW 1 MHz
Span 0 Hz
Sweep 4 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

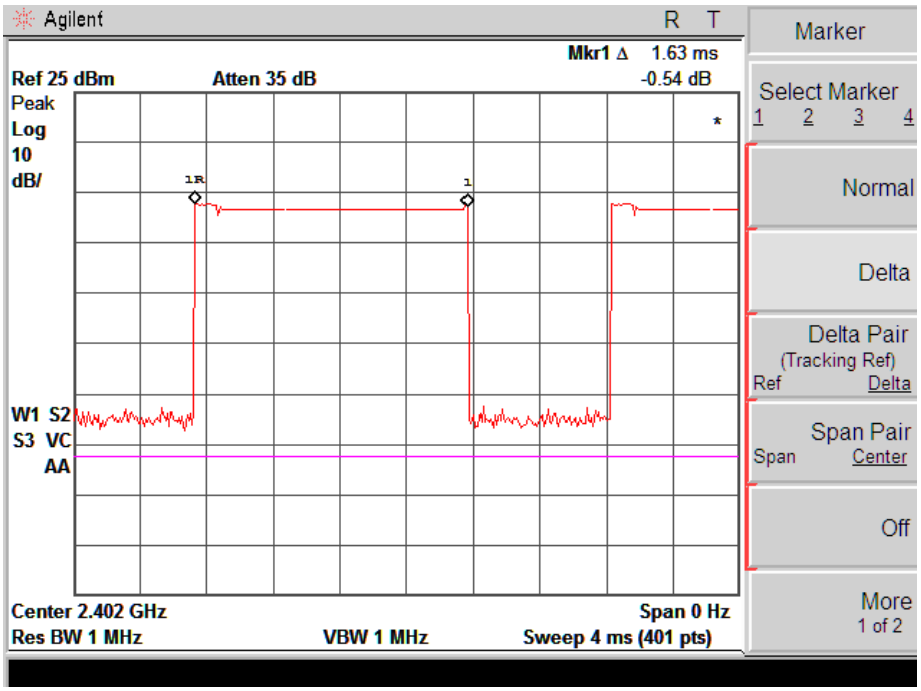
8DPSK 3DH1 time slot (Low, Middle, High Channels)

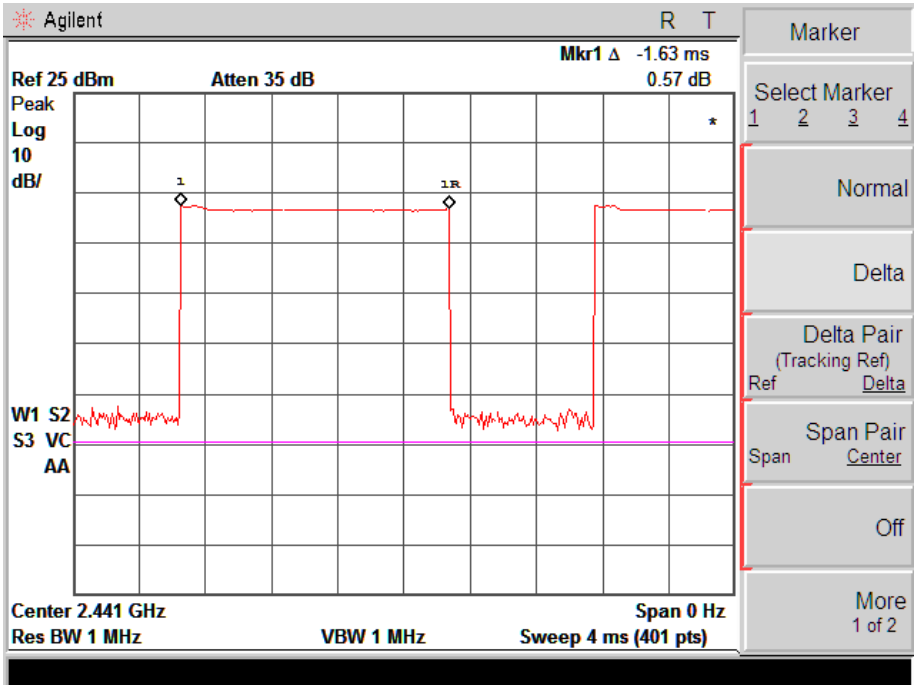


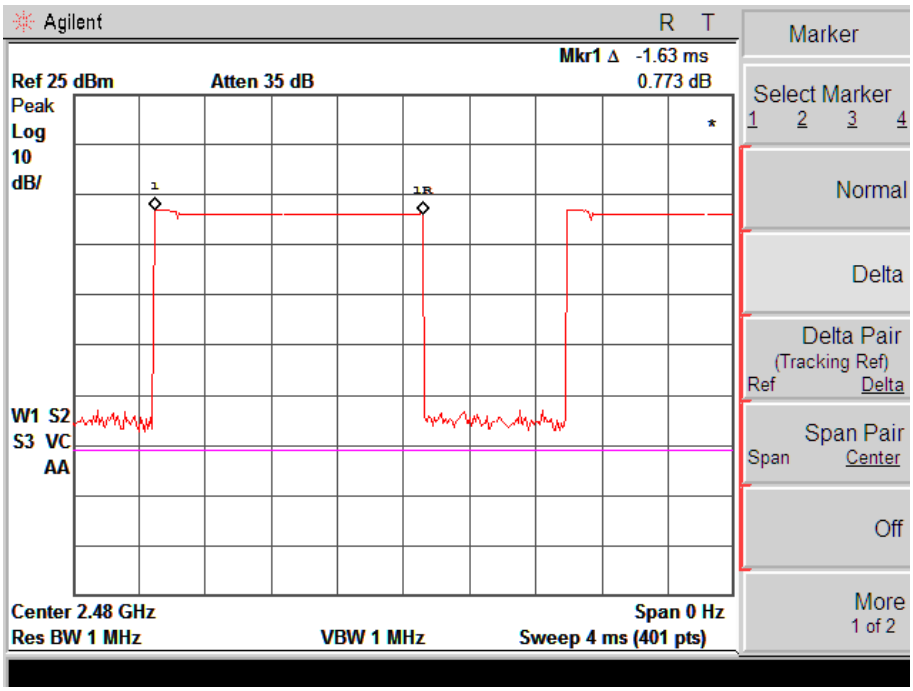




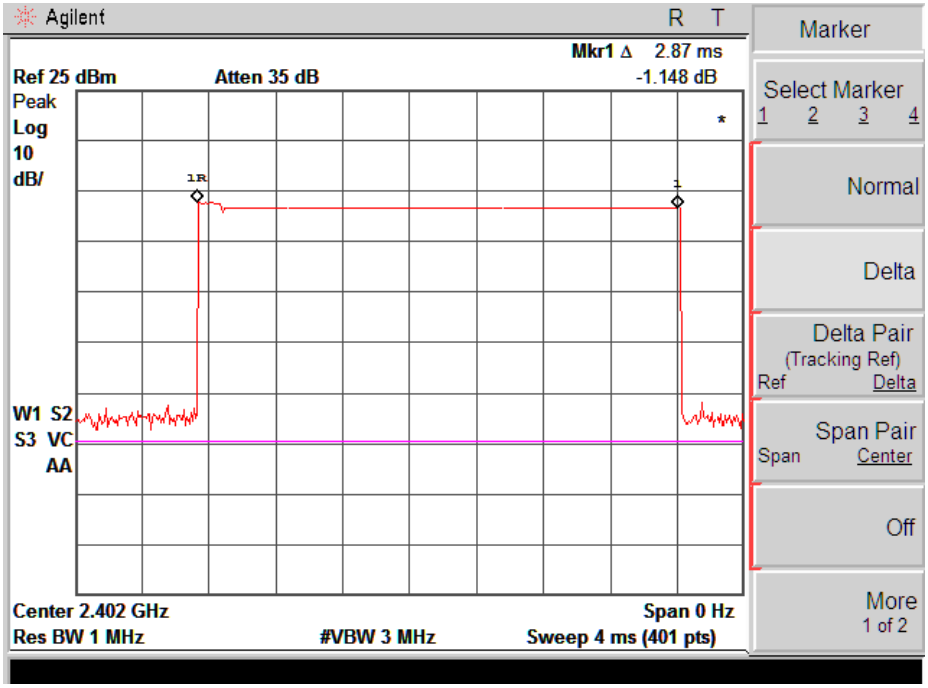
8DPSK 3DH3 time slot (Low, Middle, High Channels)

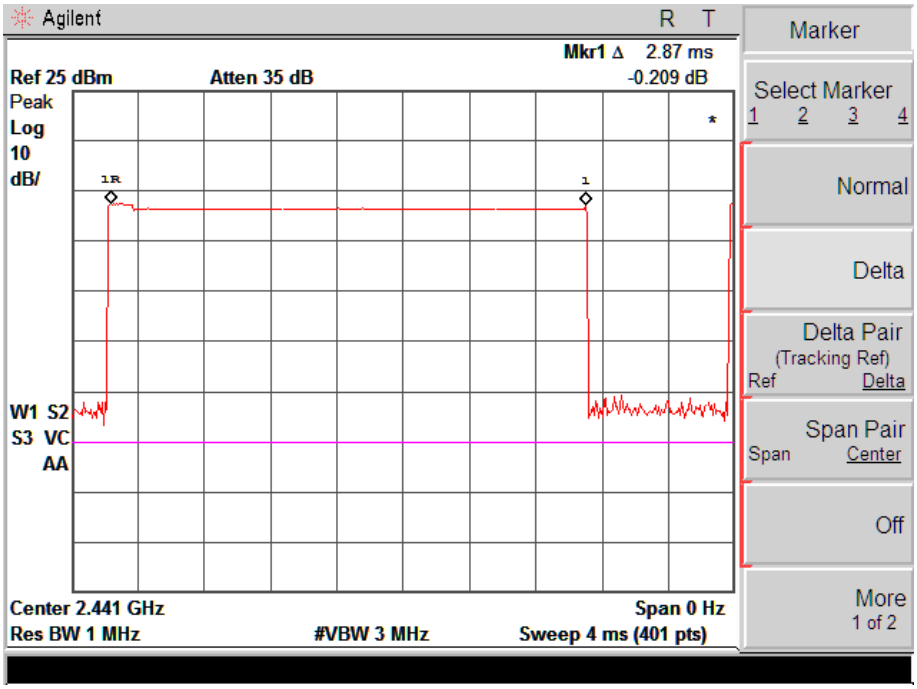


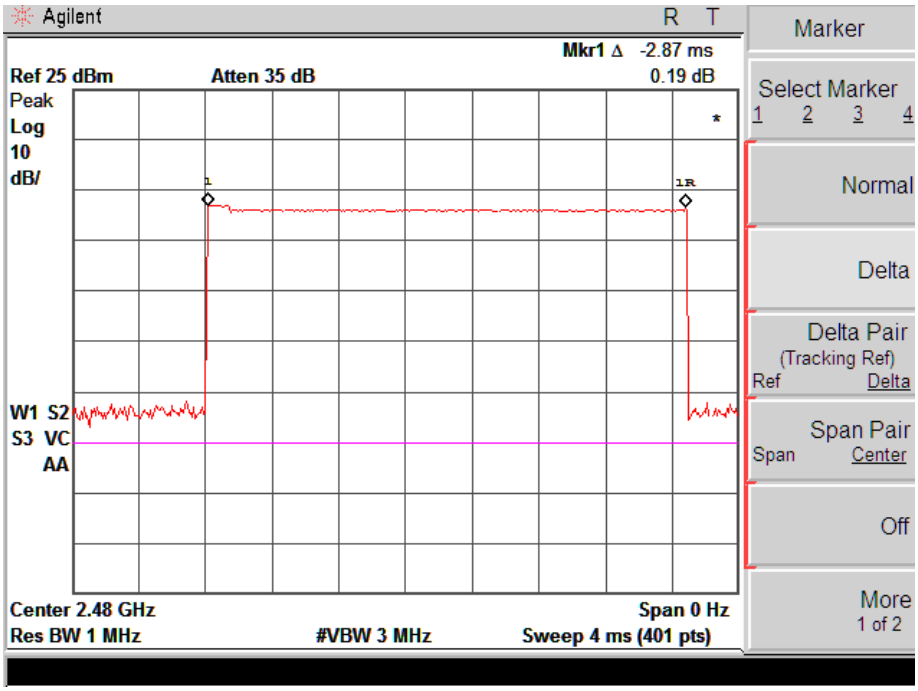

Agilent
R T
Mkr1 Δ -1.63 ms
0.57 dB
Ref 25 dBm
Atten 35 dB
Peak
Log
10
dB/
W1 S2
S3 VC
AA
Center 2.441 GHz
Res BW 1 MHz
VBW 1 MHz
Span 0 Hz
Sweep 4 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2


Agilent
R T
Mkr1 Δ -1.63 ms
0.773 dB
Ref 25 dBm
Atten 35 dB
Peak
Log
10
dB/
W1 S2
S3 VC
AA
Center 2.48 GHz
Res BW 1 MHz
VBW 1 MHz
Span 0 Hz
Sweep 4 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

8DPSK 3DH5 time slot (Low, Middle, High Channels)






Agilent
R T
Mkr1 Δ -2.87 ms
0.19 dB
Ref 25 dBm
Atten 35 dB
Peak
Log
10
dB/
W1 S2
S3 VC
AA
Center 2.48 GHz
Res BW 1 MHz
#VBW 3 MHz
Span 0 Hz
Sweep 4 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

8. 20dB Bandwidth

8.1 Standard Applicable

According to 15.247(a) and 15.215(c). 20dB bandwidth is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

8.2 Test Procedure

According to ANSI C63.10-2013 section 6.9.2, the 20dB bandwidth test method as follows.

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW.
b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW, unless otherwise specified by the applicable requirement.
c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level.
d) Steps a) through c) might require iteration to adjust within the specified tolerances.
e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target "−xx dB down" requirement; that is, if the requirement calls for measuring the −20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value.
f) Set detection mode to peak and trace mode to max hold.
g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
h) Determine the "−xx dB down amplitude" using [(reference value) − xx]. Alternatively, this calculation may be made by using the marker-delta function of the instrument.
i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j).
j) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the "−xx dB down amplitude" determined in step h). If a marker is below this "−xx dB down amplitude" value, then it shall be as close as possible to this value. The occupied bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest frequency of the envelope of the spectral display, such that the marker is at or slightly below the "−xx dB down amplitude" determined in step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth.
k) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

8.3 Environmental Conditions

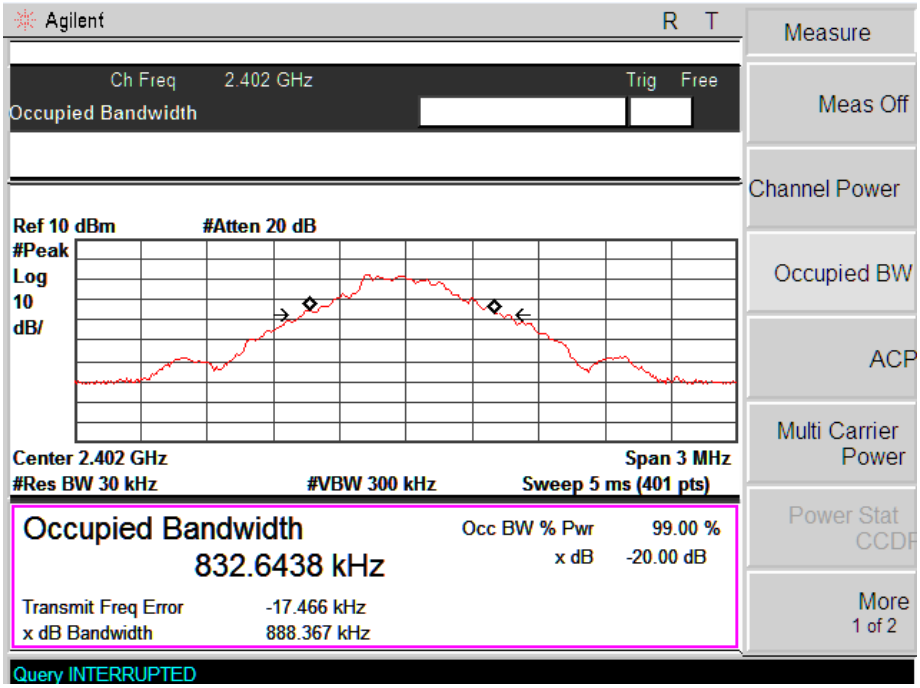
Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

8.4 Summary of Test Results/Plots

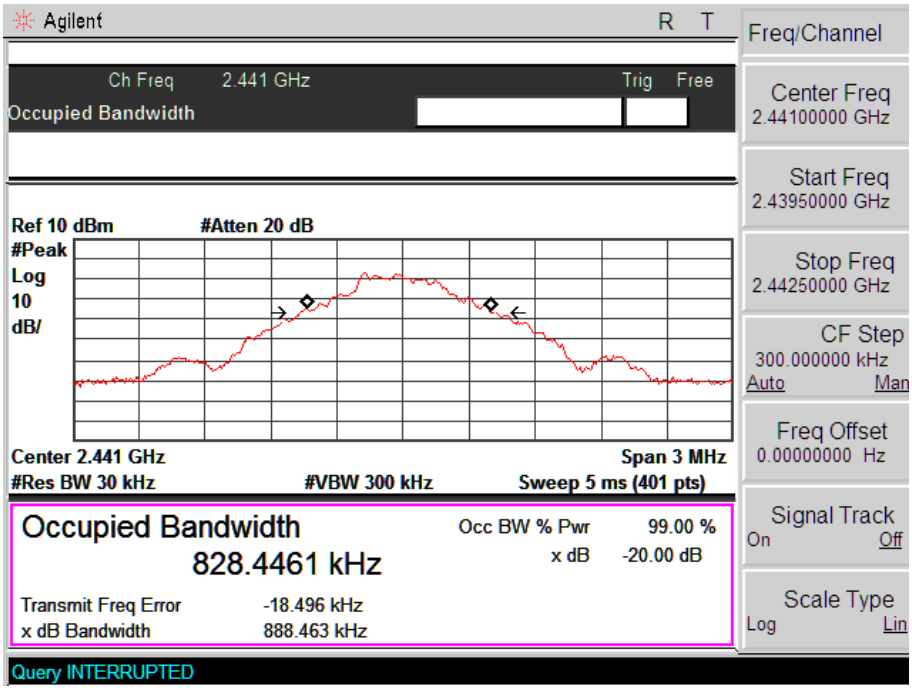
Test Mode	Test Channel MHz	20 dB Bandwidth kHz	99% Bandwidth kHz	Result
GFSK	2402	888.367	832.6438	Pass
	2441	888.463	828.4461	Pass
	2480	893.283	831.0432	Pass
Pi/4 DQPSK	2402	953.283	857.0331	Pass
	2441	952.190	851.3604	Pass
	2480	951.247	868.5885	Pass
8DPSK	2402	1261	1.1610	Pass
	2441	1262	11598	Pass
	2480	1262	11580	Pass

For GFSK

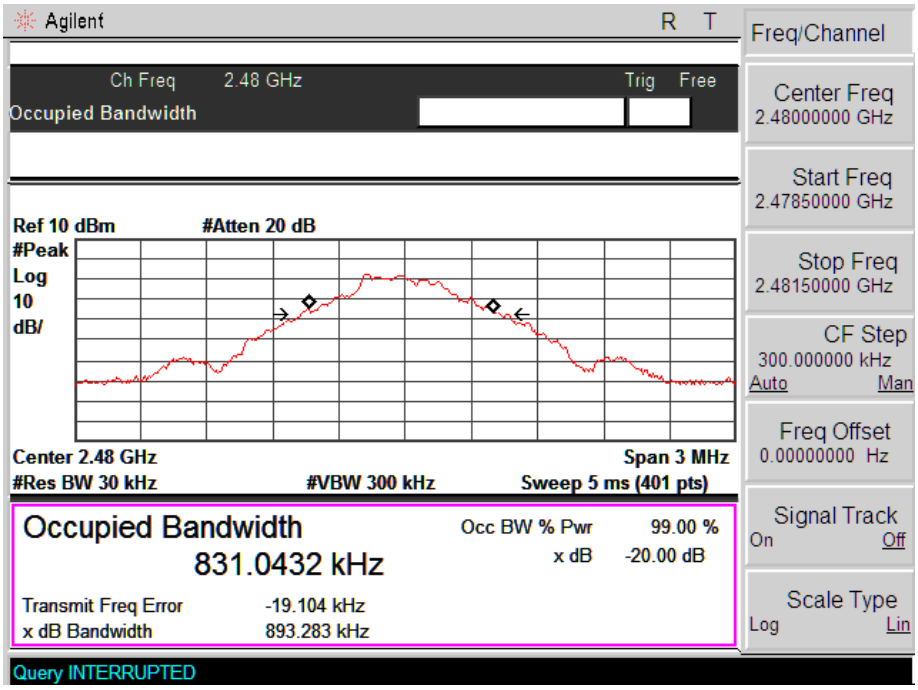
Low Channel:



Middle Channel:

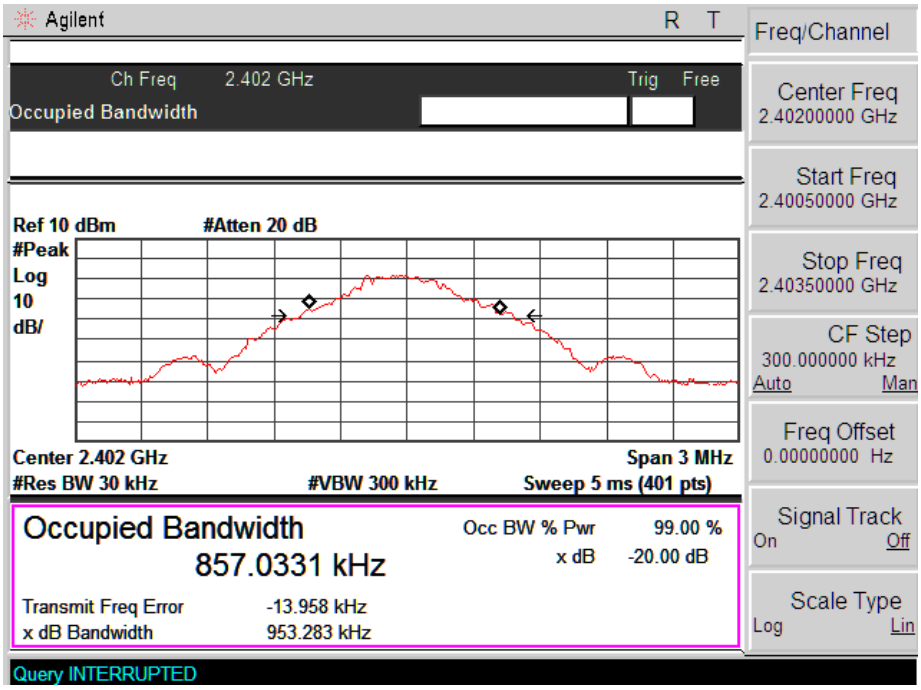


High Channel:

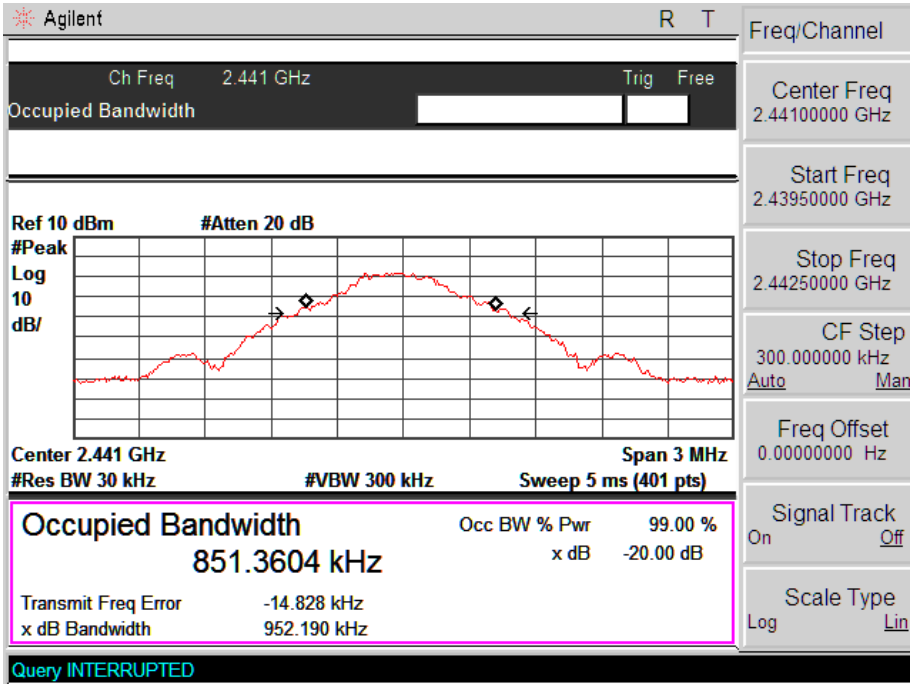


For pi/4 DQPSK

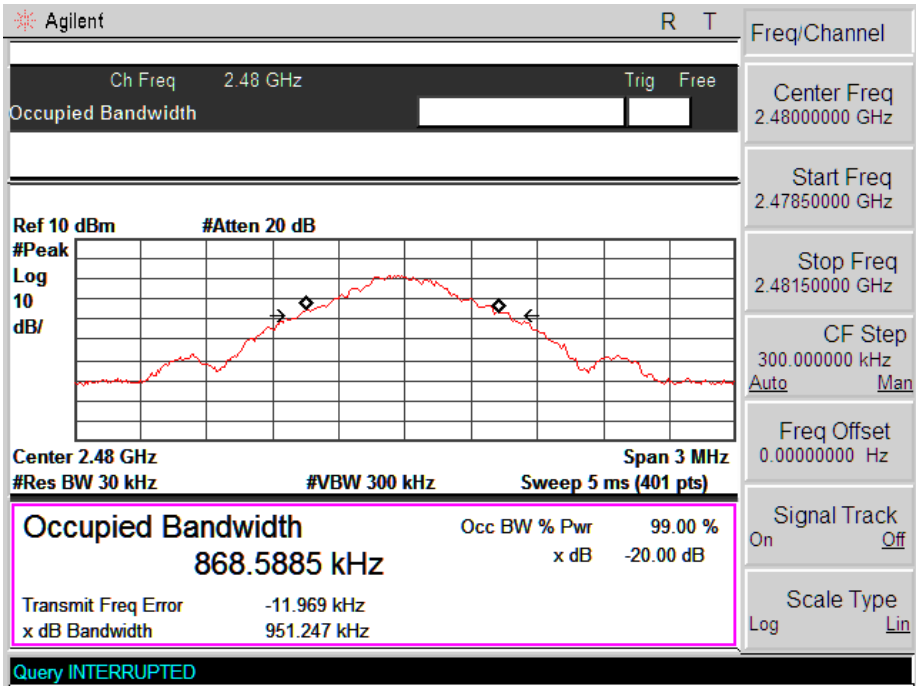
Low Channel:



Middle Channel:

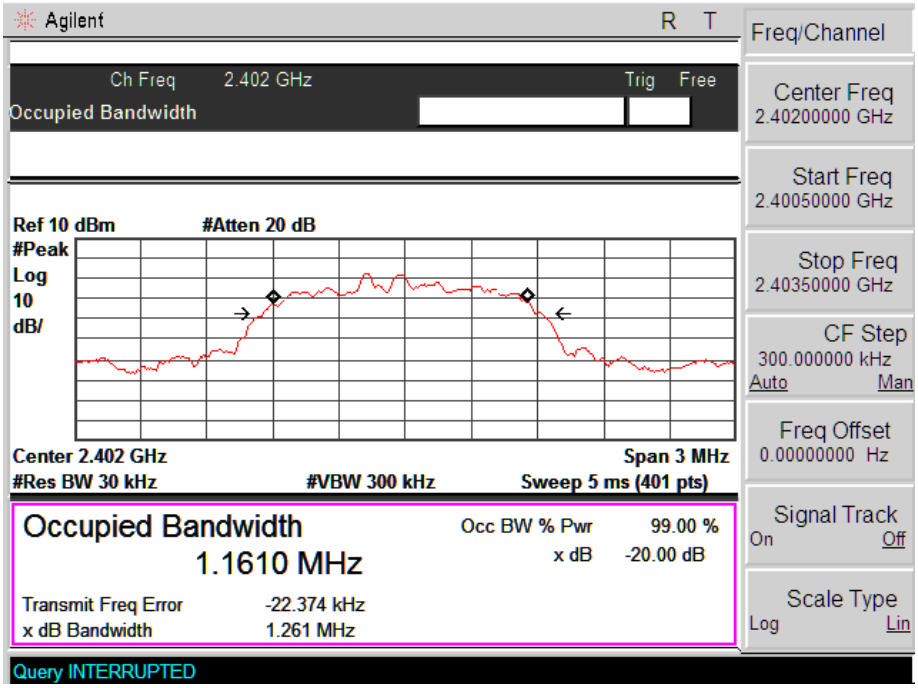


High Channel:

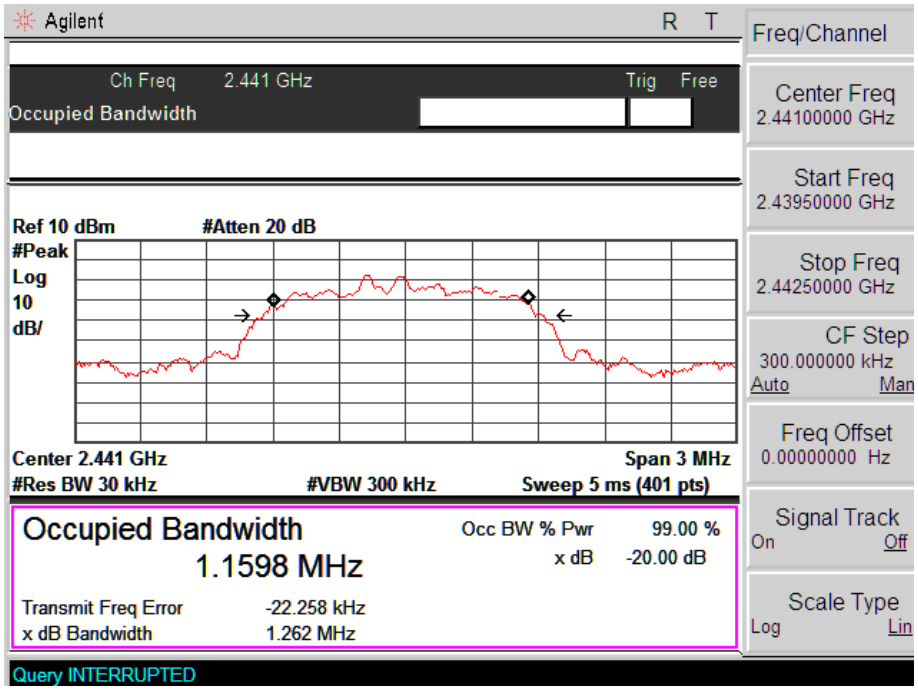


For 8DPSK

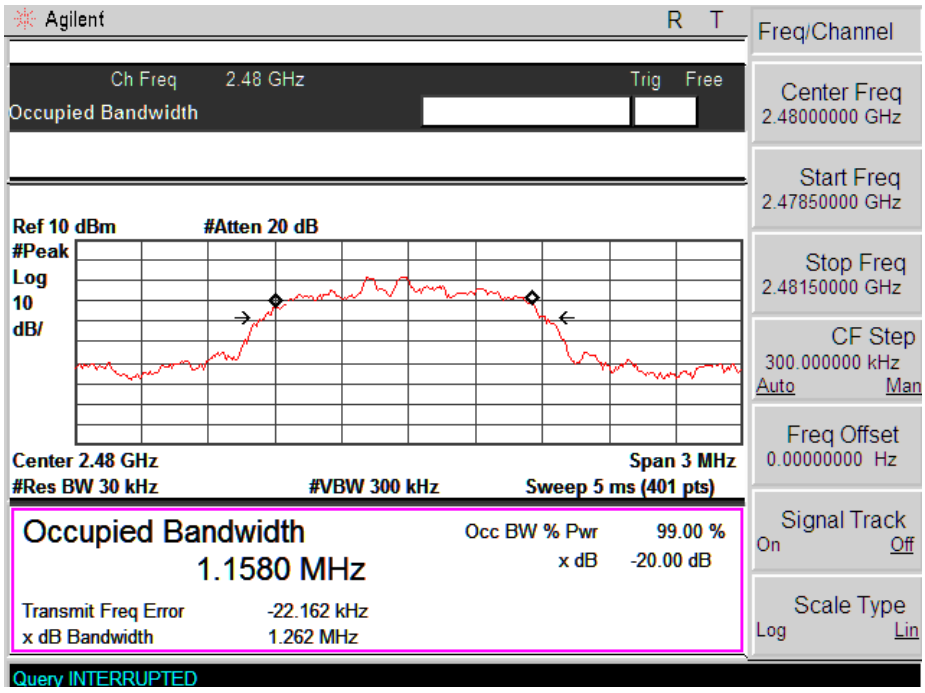
Low Channel:



Middle Channel:



High Channel:



9. RF Output Power

9.1 Standard Applicable

According to 15.247(b)(1). For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

9.2 Test Procedure

According to ANSI C63.10-2013 section 7.8.5, the output power test method as follows.
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
This is an RF-conducted test to evaluate maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation. The hopping shall be disabled for this test:

a) Use the following spectrum analyzer settings:
   1) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
   2) RBW > 20 dB bandwidth of the emission being measured.
   3) VBW ≥ RBW.
   4) Sweep: Auto.
   5) Detector function: Peak.
   6) Trace: Max hold.

b) Allow trace to stabilize.
c) Use the marker-to-peak function to set the marker to the peak of the emission.
d) The indicated level is the peak output power, after any corrections for external attenuators and cables.
e) A plot of the test results and setup description shall be included in the test report.

9.3 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	55%
ATM Pressure:	1011 mbar

9.4 Summary of Test Results/Plots

For GFSK

Channel	Frequency MHz	Measured Value dBm	Output Power mW	Limit mW
Low Channel	2402	-6.135	0.24	1000
Middle Channel	**2441**	**-5.967**	**0.25**	1000
High Channel	2480	-6.199	0.24	1000

For Pi/4 DQPSK

Channel	Frequency MHz	Measured Value dBm	Output Power mW	Limit mW
Low Channel	2402	-6.151	0.24	1000
Middle Channel	2441	-6.003	0.25	1000
High Channel	2480	-6.243	0.24	1000

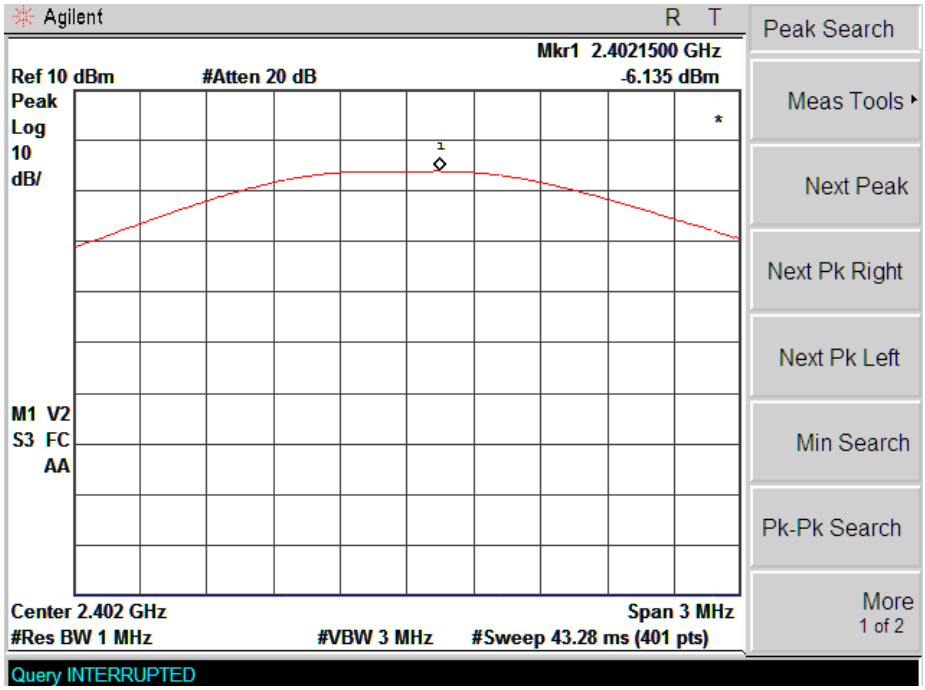
For 8DPSK

Channel	Frequency MHz	Measured Value dBm	Output Power mW	Limit mW
Low Channel	2402	-6.192	0.24	1000
Middle Channel	2441	-6.022	0.25	1000
High Channel	2480	-6.243	0.24	1000

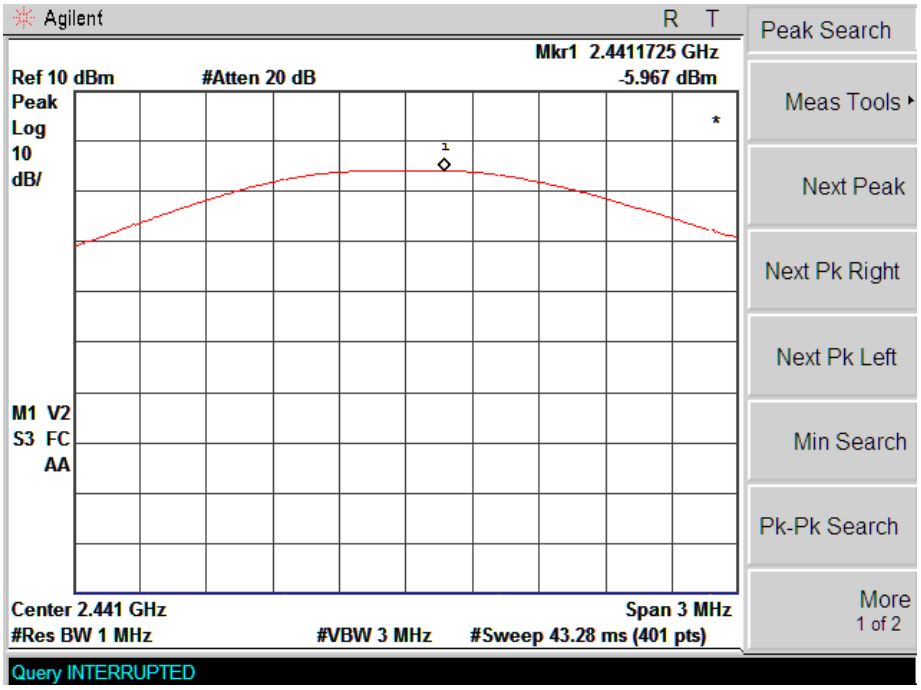
Note: the antenna gain of 0dBi less than 6dBi maximum permission antenna gain value based on 1 watt peak output power limit.

For GFSK mode

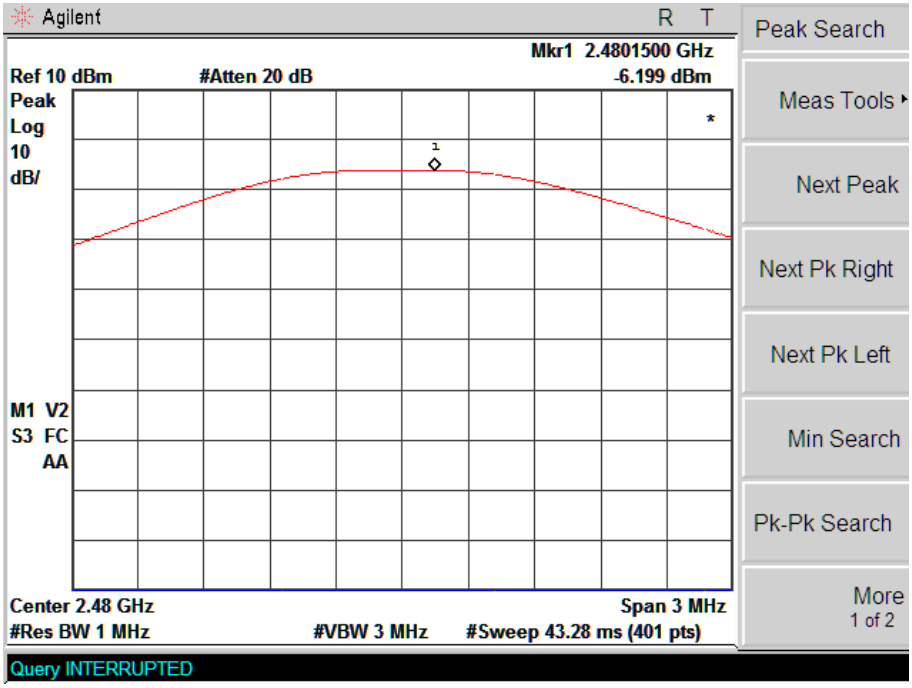
Low CH



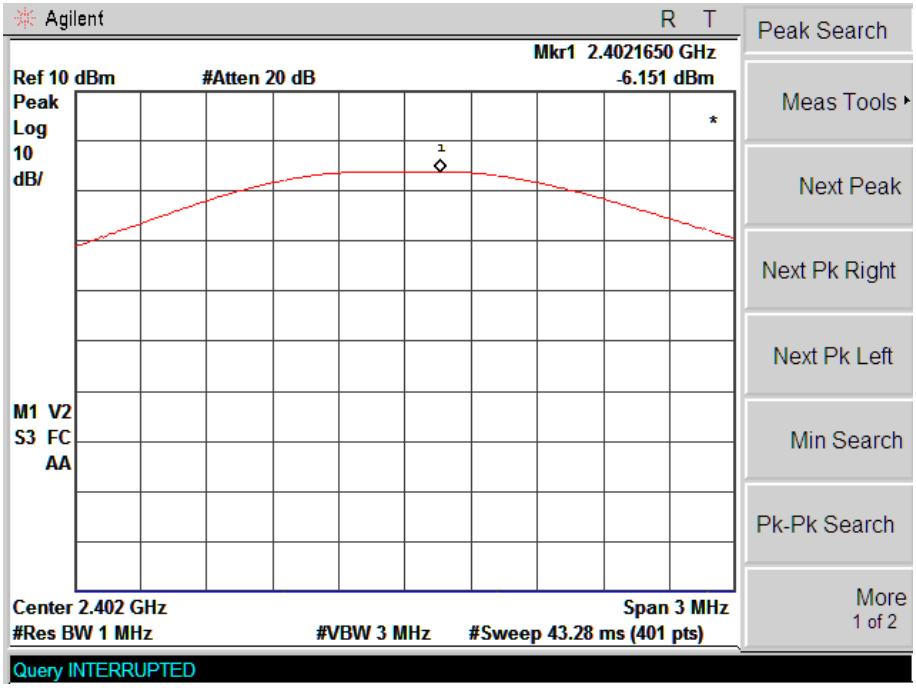
Middle CH



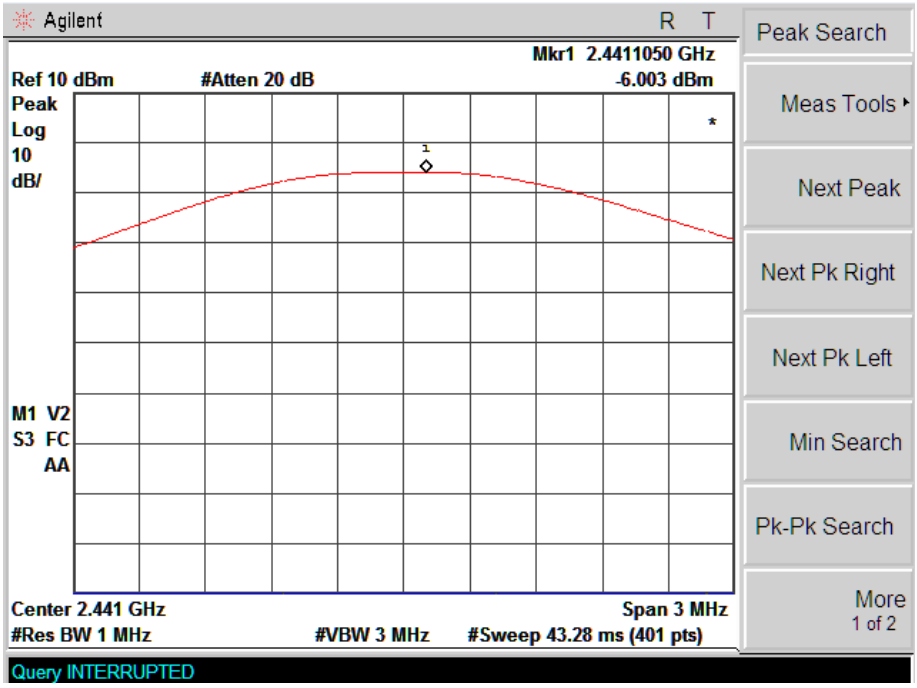
High CH


Agilent
R T
Mkr1 2.4801500 GHz
Ref 10 dBm
#Atten 20 dB
-6.199 dBm
Peak
Log
10
dB/
M1 V2
S3 FC
AA
Center 2.48 GHz
Span 3 MHz
#Res BW 1 MHz
#VBW 3 MHz
#Sweep 43.28 ms (401 pts)
Query INTERRUPTED
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

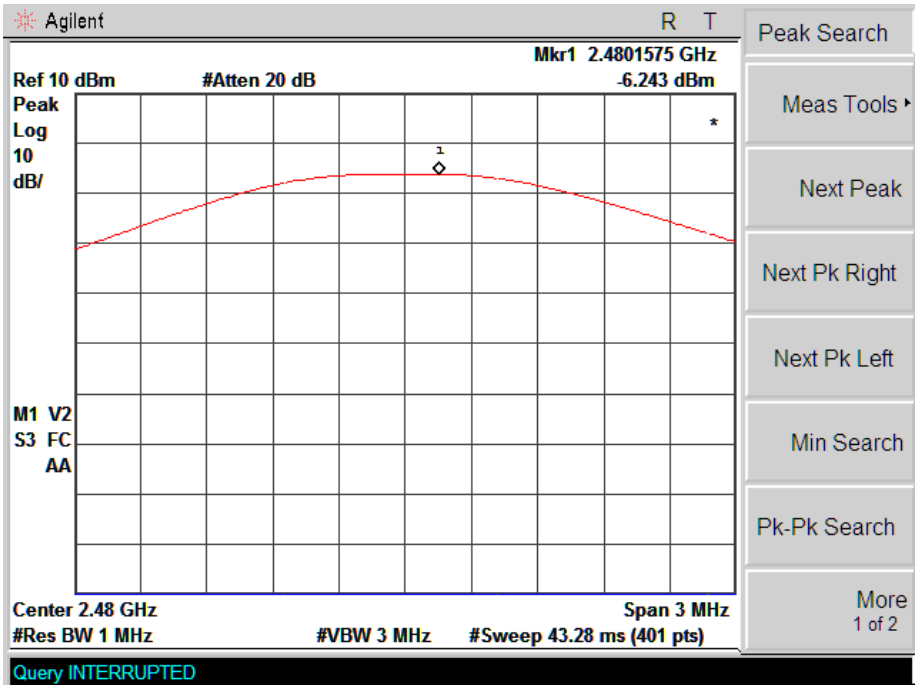
For pi/4 DQPSK mode
Low CH



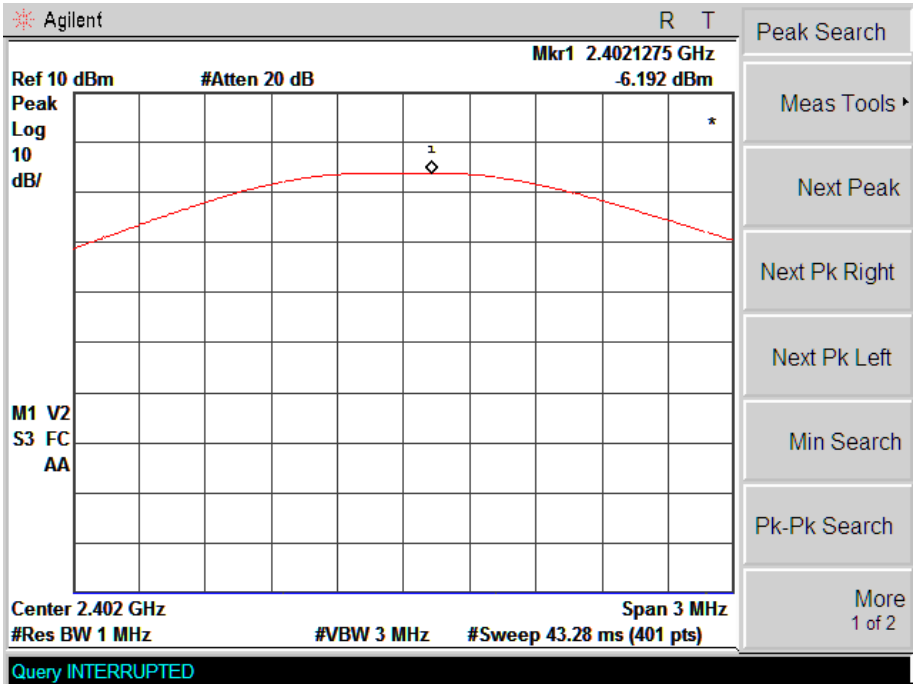
Middle CH



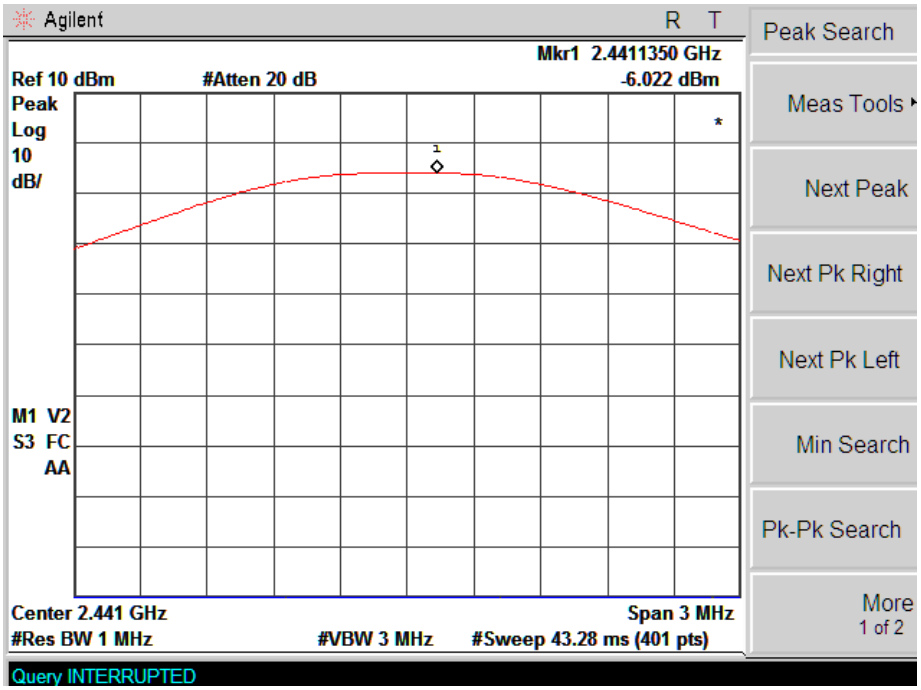
High CH


Agilent
R T
Mkr1 2.4801575 GHz
Ref 10 dBm
#Atten 20 dB
-6.243 dBm
Peak
Log
10
dB/
M1 V2
S3 FC
AA
Center 2.48 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 3 MHz
#Sweep 43.28 ms (401 pts)
Query INTERRUPTED
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

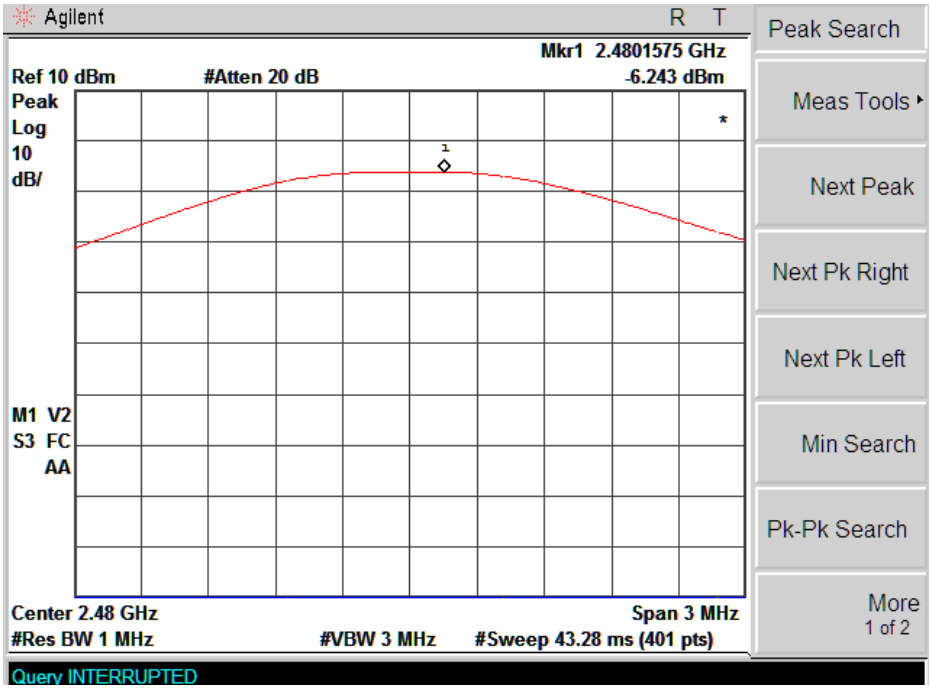
For 8DPSK mode
Low CH



Middle CH



High CH


Agilent
R T
Mkr1 2.4801575 GHz
Ref 10 dBm
#Atten 20 dB
-6.243 dBm
Peak
Log
10
dB/
M1 V2
S3 FC
AA
Center 2.48 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 3 MHz
#Sweep 43.28 ms (401 pts)
Query INTERRUPTED
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

10. Field Strength of Spurious Emissions

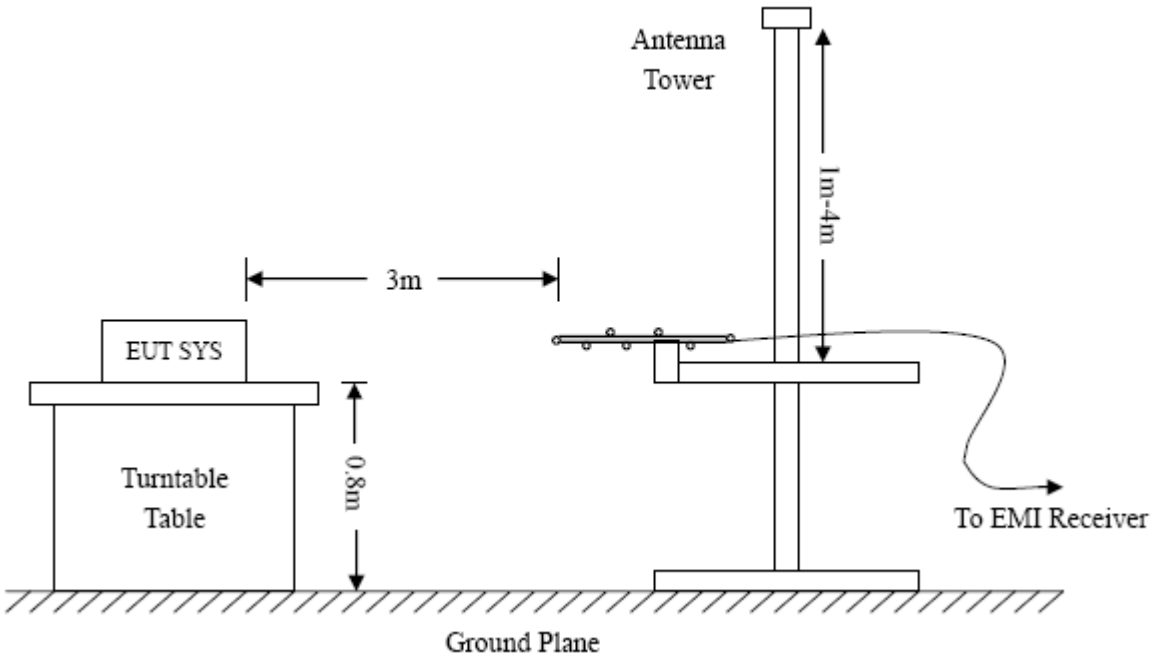
10.1 Standard Applicable

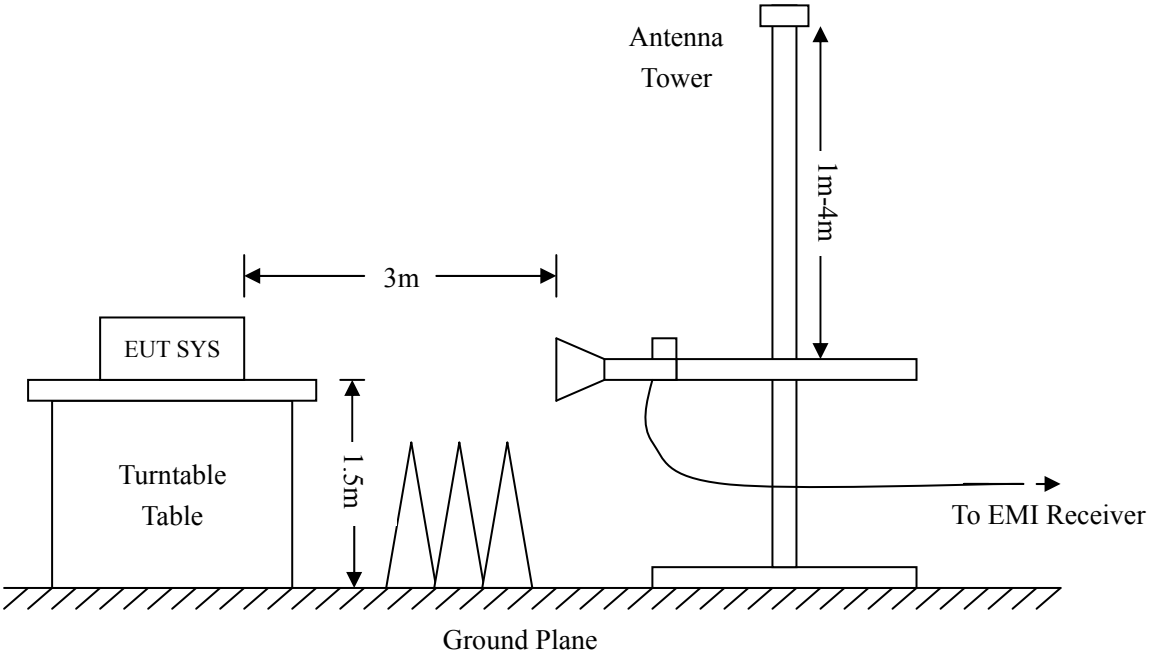
According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within 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).

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

10.2 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.247(a) and FCC Part 15.209 Limit.
The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.
The spacing between the peripherals was 10 cm.





Frequency :9kHz-30MHz	Frequency :30MHz-1GHz	Frequency :Above 1GHz
RBW=10KHz,	RBW=120KHz,	RBW=1MHz,
VBW =30KHz	VBW=300KHz	VBW=3MHz(Peak), 10Hz(AV)
Sweep time= Auto	Sweep time= Auto	Sweep time= Auto
Trace = max hold	Trace = max hold	Trace = max hold
Detector function = peak	Detector function = peak, QP	Detector function = peak, AV

10.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Ant. Factor + Cable Loss – Ampl. Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – FCC Part 15 Limit

10.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

10.5 Summary of Test Results/Plots

According to the data below, the FCC Part 15.205, 15.209 and 15.247 standards, and had the worst cases:

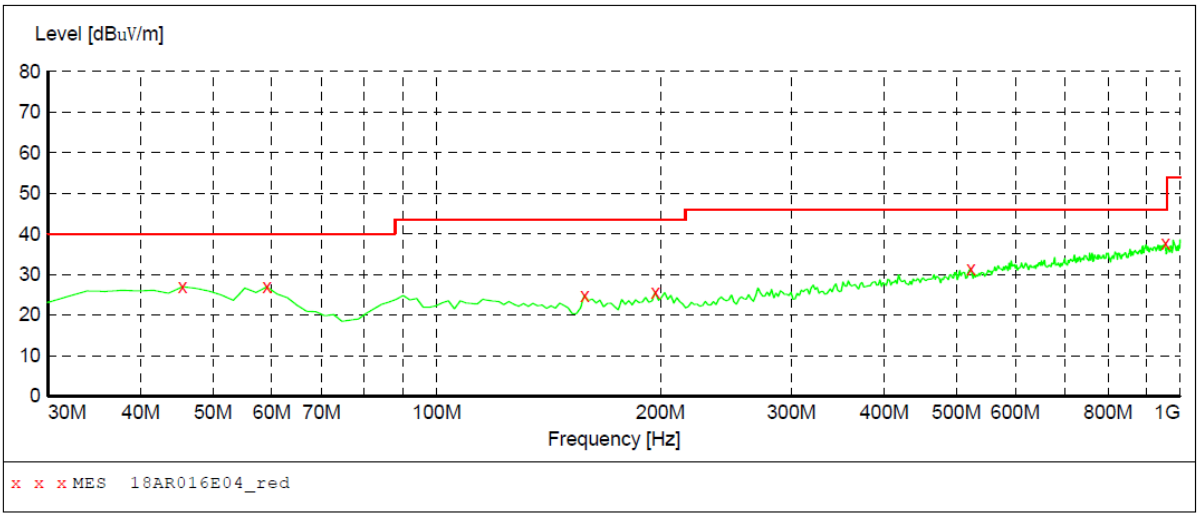
Plot of Radiated Emissions Test Data (30MHz to 1GHz)

EUT: *CH BLUETOOTH SOUNDBAR SPEAKER*
Tested Model: *SBB-61250*
Operating Condition: *GFSK Transmitting Low Channel (2402MHz)*
Comment: *DC 5.8V(with a adapter input AC 120V/60Hz)*

Test Specification: *Horizontal*

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT: "18AR016E04_red"

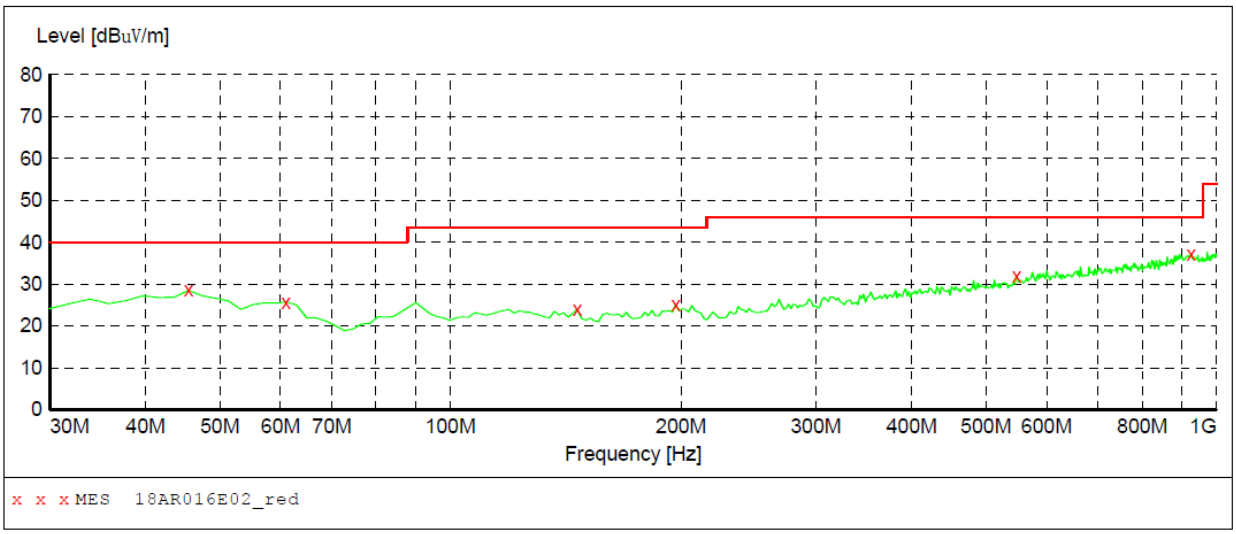
2018-2-16 01:46PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	27.00	16.8	40.0	13.0	---	100.0	0.00	HORIZONTAL
59.100000	26.90	15.7	40.0	13.1	---	100.0	0.00	HORIZONTAL
158.040000	24.90	12.3	43.5	18.6	---	100.0	0.00	HORIZONTAL
196.840000	25.60	13.8	43.5	17.9	---	100.0	0.00	HORIZONTAL
522.760000	31.40	19.6	46.0	14.6	---	100.0	0.00	HORIZONTAL
955.380000	37.60	25.3	46.0	8.4	---	100.0	0.00	HORIZONTAL

Test Specification: *Vertical*

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT: "18AR016E02_red"

2018-2-16 01:42PM

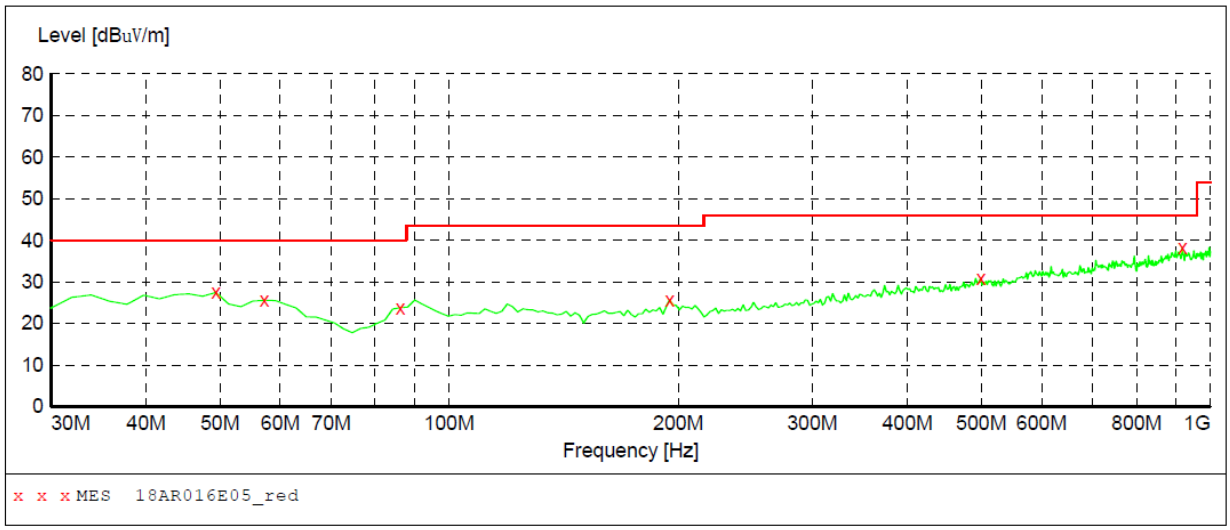
Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	28.50	16.8	40.0	11.5	---	100.0	0.00	VERTICAL
61.040000	25.70	14.9	40.0	14.3	---	100.0	0.00	VERTICAL
146.400000	24.00	12.0	43.5	19.5	---	100.0	0.00	VERTICAL
196.840000	25.00	13.8	43.5	18.5	---	100.0	0.00	VERTICAL
547.980000	32.00	20.3	46.0	14.0	---	100.0	0.00	VERTICAL
926.280000	37.20	25.9	46.0	8.8	---	100.0	0.00	VERTICAL

Operating Condition: *GFSK Transmitting Middle Channel (2441MHz)*
Comment: *DC 5.8V(with a adapter input AC 120V/60Hz)*

Test Specification: *Horizontal*

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT: "18AR016E05_red"

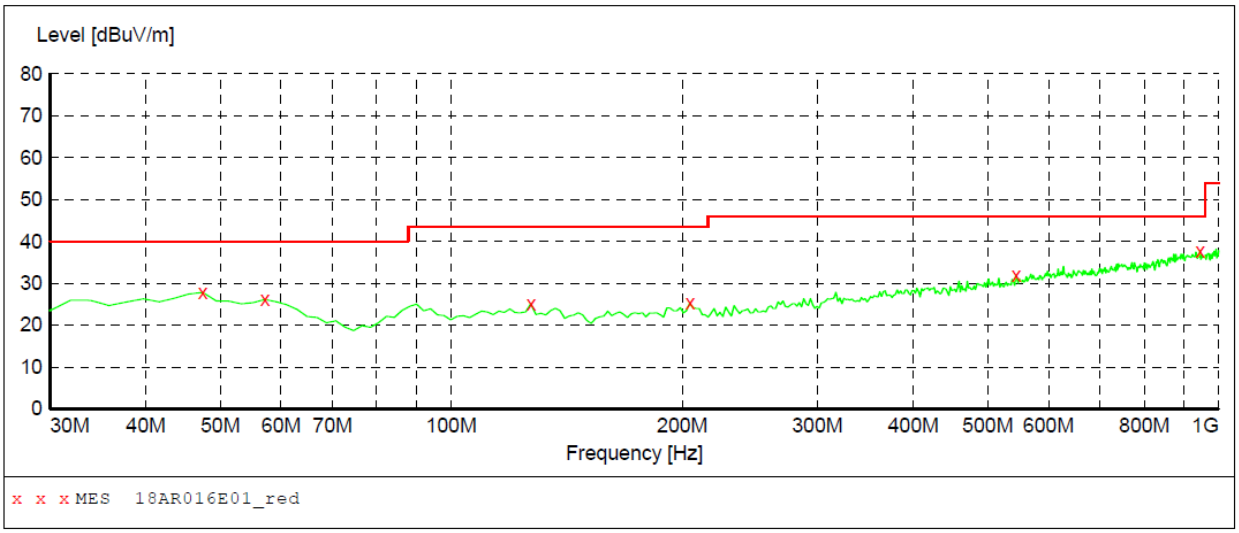
2018-2-16 01:47PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
49.400000	27.50	15.3	40.0	12.5	---	100.0	0.00	HORIZONTAL
57.160000	25.60	15.7	40.0	14.4	---	100.0	0.00	HORIZONTAL
86.260000	23.80	12.9	40.0	16.2	---	100.0	0.00	HORIZONTAL
194.900000	25.70	13.7	43.5	17.8	---	100.0	0.00	HORIZONTAL
499.480000	30.90	19.5	46.0	15.1	---	100.0	0.00	HORIZONTAL
918.520000	38.10	25.7	46.0	7.9	---	100.0	0.00	HORIZONTAL

Test Specification: *Vertical*

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT: "18AR016E01_red"

2018-2-16 01:41PM

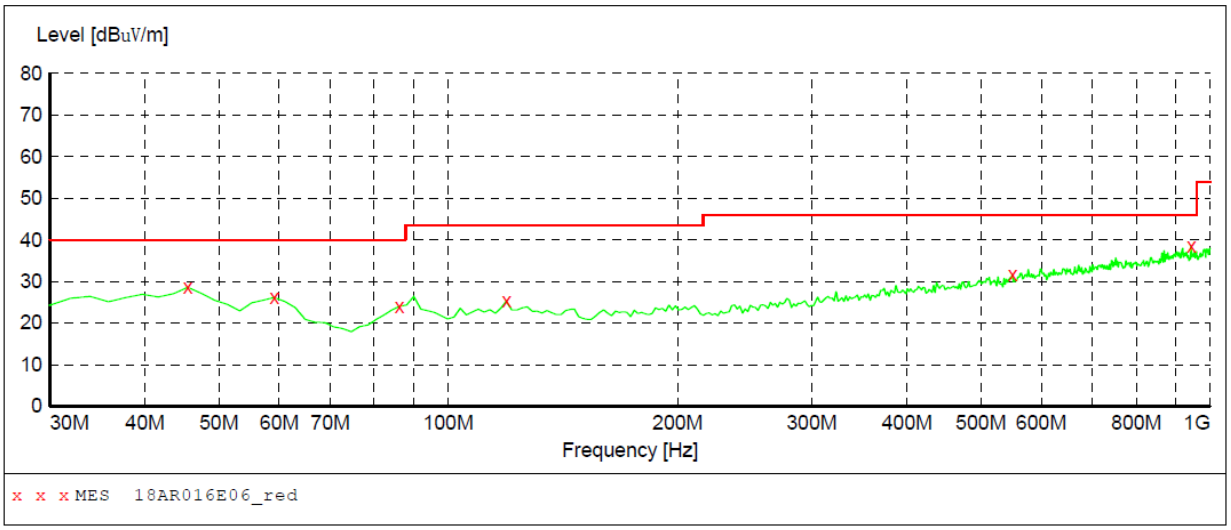
Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	27.80	16.7	40.0	12.2	---	100.0	0.00	VERTICAL
57.160000	26.10	15.7	40.0	13.9	---	100.0	0.00	VERTICAL
127.000000	25.10	12.9	43.5	18.4	---	100.0	0.00	VERTICAL
204.600000	25.20	14.1	43.5	18.3	---	100.0	0.00	VERTICAL
544.100000	31.80	19.9	46.0	14.2	---	100.0	0.00	VERTICAL
945.680000	37.80	25.3	46.0	8.2	---	100.0	0.00	VERTICAL

Operating Condition: *GFSK Transmitting High Channel (2480MHz)*
Comment: *DC 5.8V(with a adapter input AC 120V/60Hz)*

Test Specification: *Horizontal*

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT: "18AR016E06_red"

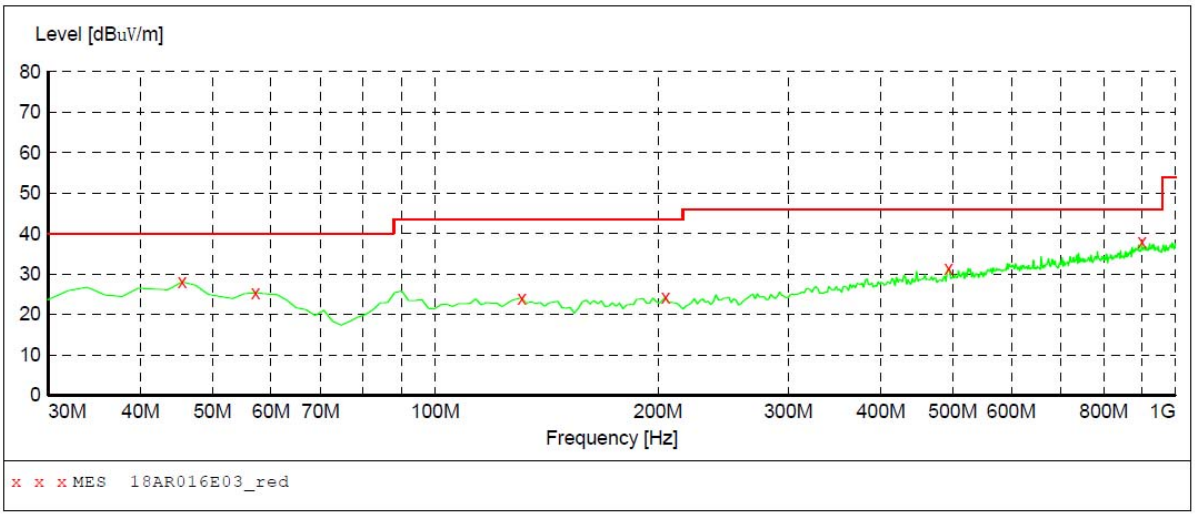
2018-2-16 01:48PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	28.60	16.8	40.0	11.4	---	100.0	0.00	HORIZONTAL
59.100000	26.10	15.7	40.0	13.9	---	100.0	0.00	HORIZONTAL
86.260000	24.00	12.9	40.0	16.0	---	100.0	0.00	HORIZONTAL
119.240000	25.30	13.2	43.5	18.2	---	100.0	0.00	HORIZONTAL
549.920000	31.60	20.5	46.0	14.4	---	100.0	0.00	HORIZONTAL
943.740000	38.50	25.3	46.0	7.5	---	100.0	0.00	HORIZONTAL

Test Specification: *Vertical*

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT: "18AR016E03_red"

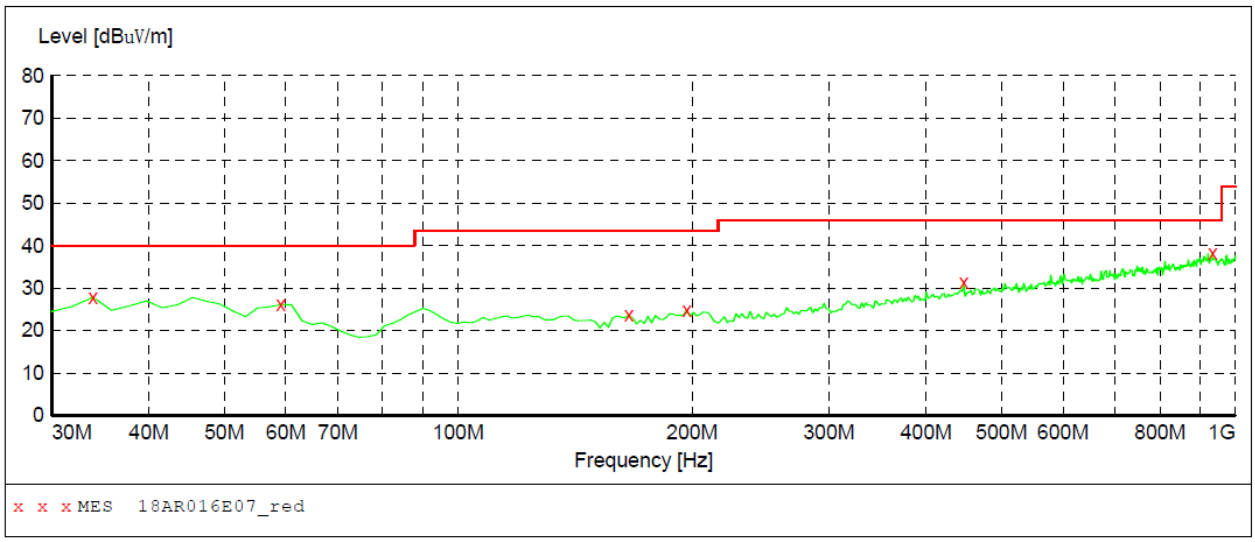
2018-2-16 01:44PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	28.00	16.8	40.0	12.0	---	100.0	0.00	VERTICAL
57.160000	25.30	15.7	40.0	14.7	---	100.0	0.00	VERTICAL
130.880000	24.10	12.7	43.5	19.4	---	100.0	0.00	VERTICAL
204.600000	24.30	14.1	43.5	19.2	---	100.0	0.00	VERTICAL
493.660000	31.40	19.5	46.0	14.6	---	100.0	0.00	VERTICAL
901.060000	38.00	25.8	46.0	8.0	---	100.0	0.00	VERTICAL

EUT:	*CH BLUETOOTH SOUNDBAR SPEAKER*
Tested Model:	*SBB-61250*
Operating Condition:	*Pi/4 DQPSK Transmitting Low Channel (2402MHz)*
Comment:	*DC 5.8V(with a adapter input AC 120V/60Hz)*
Test Specification:	*Horizontal*

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT: "18AR016E07_red"

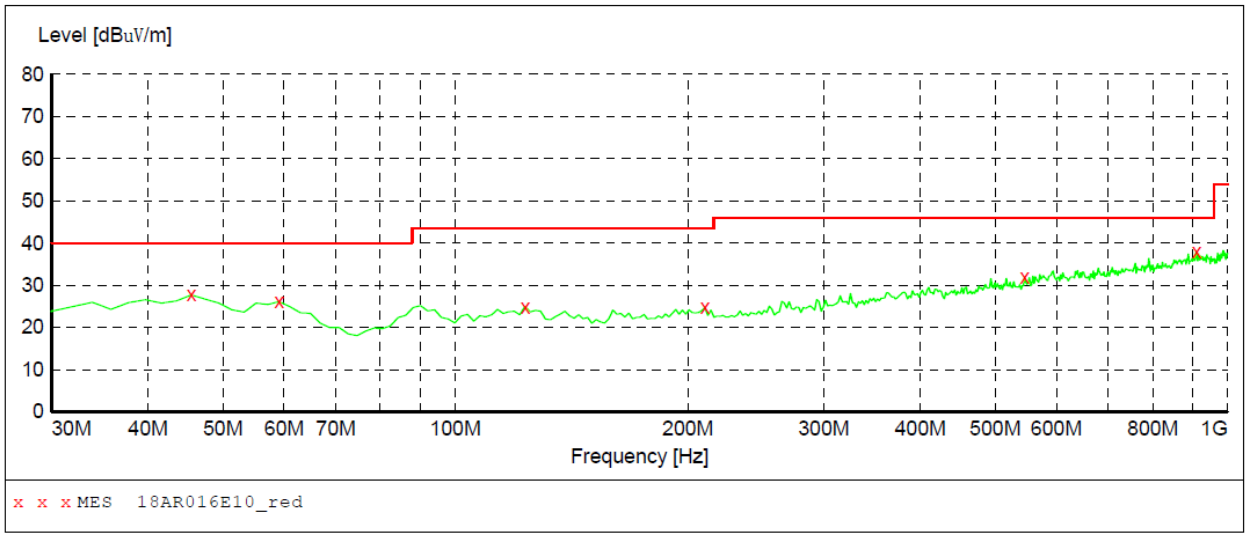
2018-2-16 01:51PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
33.880000	27.80	15.1	40.0	12.2	---	100.0	0.00	HORIZONTAL
59.100000	26.10	15.7	40.0	13.9	---	100.0	0.00	HORIZONTAL
165.800000	23.60	12.9	43.5	19.9	---	100.0	0.00	HORIZONTAL
196.840000	24.90	13.8	43.5	18.6	---	100.0	0.00	HORIZONTAL
447.100000	31.30	18.3	46.0	14.7	---	100.0	0.00	HORIZONTAL
934.040000	38.30	25.7	46.0	7.7	---	100.0	0.00	HORIZONTAL

Test Specification: *Vertical*

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT: "18AR016E10_red"

2018-2-16 01:55PM

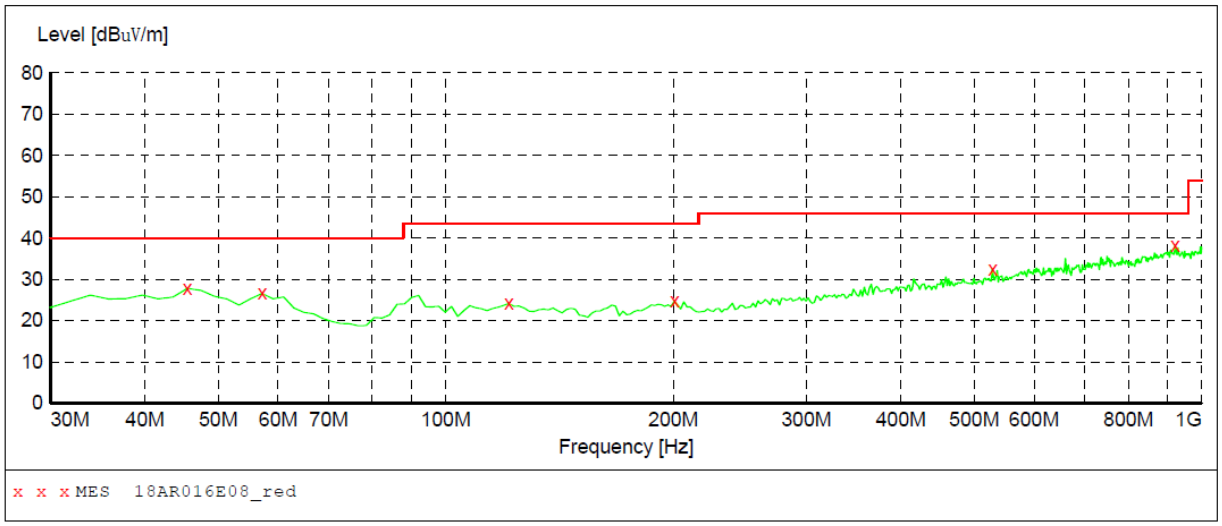
Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	27.70	16.8	40.0	12.3	---	100.0	0.00	VERTICAL
59.100000	26.10	15.7	40.0	13.9	---	100.0	0.00	VERTICAL
123.120000	24.90	13.1	43.5	18.6	---	100.0	0.00	VERTICAL
210.420000	24.70	14.0	43.5	18.8	---	100.0	0.00	VERTICAL
546.040000	31.80	20.1	46.0	14.2	---	100.0	0.00	VERTICAL
910.760000	37.90	25.8	46.0	8.1	---	100.0	0.00	VERTICAL

Operating Condition: *Pi/4 DQPSK Transmitting Middle Channel (2441MHz)*
Comment: *DC 5.8V(with a adapter input AC 120V/60Hz)*

Test Specification: *Horizontal*

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT: "18AR016E08_red"

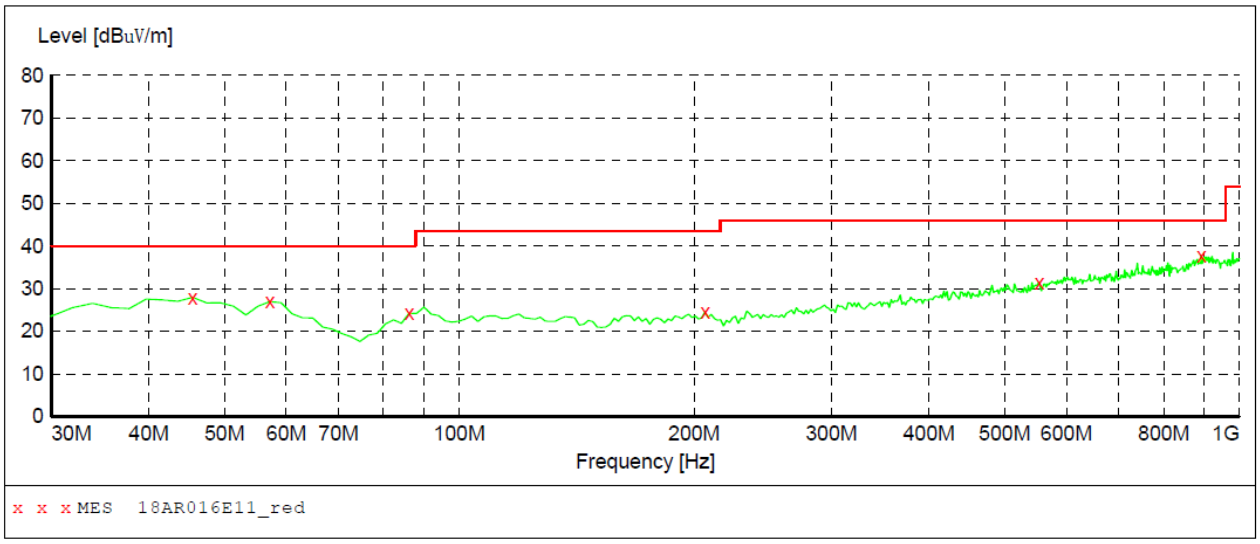
2018-2-16 01:52PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	27.80	16.8	40.0	12.2	---	100.0	0.00	HORIZONTAL
57.160000	26.60	15.7	40.0	13.4	---	100.0	0.00	HORIZONTAL
121.180000	24.10	13.2	43.5	19.4	---	100.0	0.00	HORIZONTAL
200.720000	24.70	14.0	43.5	18.8	---	100.0	0.00	HORIZONTAL
528.580000	32.50	19.7	46.0	13.5	---	100.0	0.00	HORIZONTAL
922.400000	38.10	25.8	46.0	7.9	---	100.0	0.00	HORIZONTAL

Test Specification: *Vertical*

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT: "18AR016E11_red"

2018-2-16 01:57PM

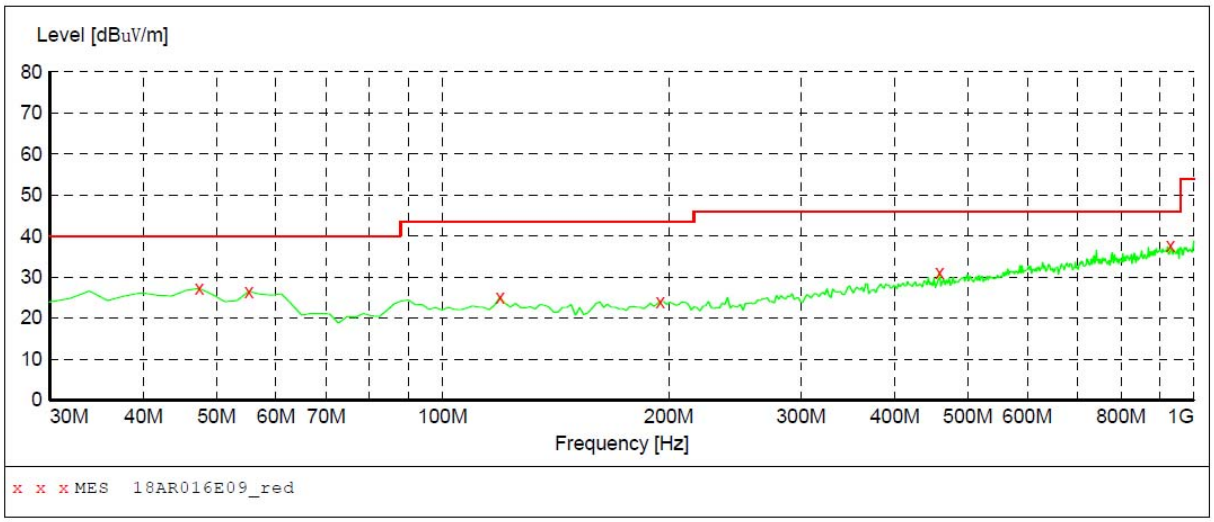
Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	27.90	16.8	40.0	12.1	---	100.0	0.00	VERTICAL
57.160000	26.90	15.7	40.0	13.1	---	100.0	0.00	VERTICAL
86.260000	24.20	12.9	40.0	15.8	---	100.0	0.00	VERTICAL
206.540000	24.50	14.1	43.5	19.0	---	100.0	0.00	VERTICAL
553.800000	31.50	20.4	46.0	14.5	---	100.0	0.00	VERTICAL
893.300000	37.70	25.6	46.0	8.3	---	100.0	0.00	VERTICAL

Operating Condition: *Pi/4 DQPSK Transmitting High Channel (2480MHz)*
Comment: *DC 5.8V(with a adapter input AC 120V/60Hz)*

Test Specification: *Horizontal*

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT: "18AR016E09_red"

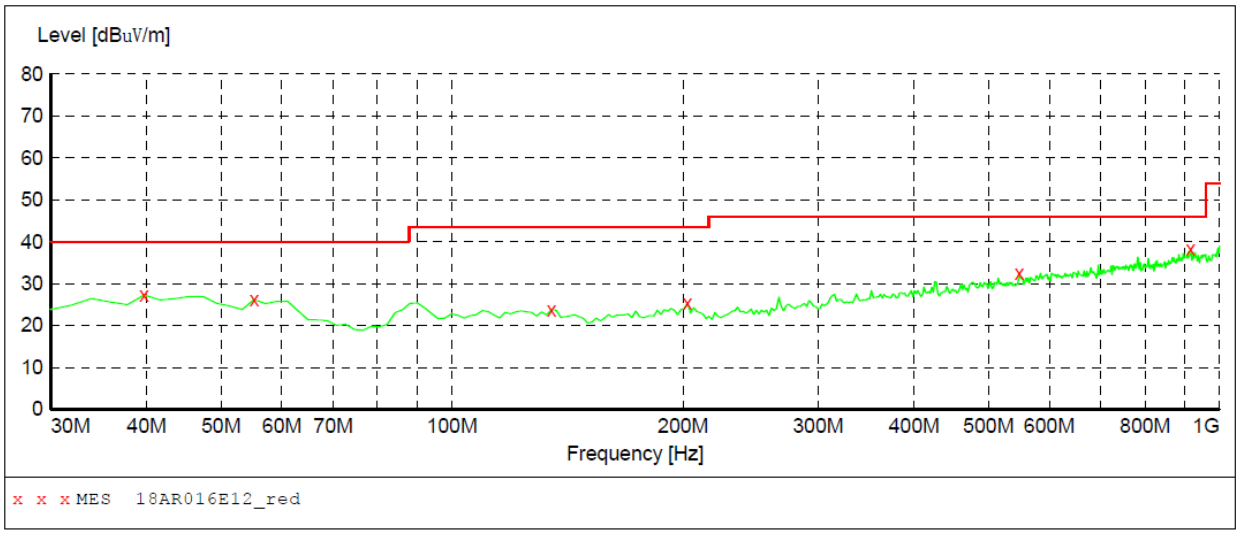
2018-2-16 01:54PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	27.20	16.7	40.0	12.8	---	100.0	0.00	HORIZONTAL
55.220000	26.50	15.1	40.0	13.5	---	100.0	0.00	HORIZONTAL
119.240000	25.10	13.2	43.5	18.4	---	100.0	0.00	HORIZONTAL
194.900000	24.10	13.7	43.5	19.4	---	100.0	0.00	HORIZONTAL
458.740000	31.20	18.6	46.0	14.8	---	100.0	0.00	HORIZONTAL
930.160000	37.70	25.9	46.0	8.3	---	100.0	0.00	HORIZONTAL

Test Specification: *Vertical*

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT: "18AR016E12_red"

2018-2-16 01:58PM

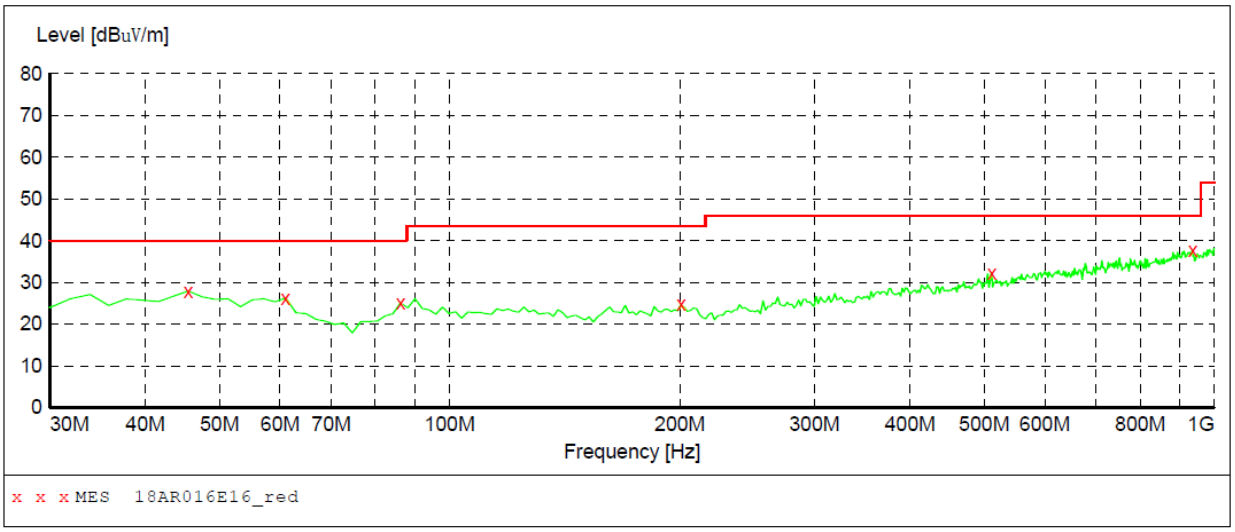
Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
39.700000	27.30	15.7	40.0	12.7	---	100.0	0.00	VERTICAL
55.220000	26.20	15.1	40.0	13.8	---	100.0	0.00	VERTICAL
134.760000	23.80	12.6	43.5	19.7	---	100.0	0.00	VERTICAL
202.660000	25.40	14.0	43.5	18.1	---	100.0	0.00	VERTICAL
547.980000	32.50	20.3	46.0	13.5	---	100.0	0.00	VERTICAL
916.580000	38.10	25.8	46.0	7.9	---	100.0	0.00	VERTICAL

EUT:	*CH BLUETOOTH SOUNDBAR SPEAKER*
Tested Model:	*SBB-61250*
Operating Condition:	*8DPSK Transmitting Low Channel (2402MHz)*
Comment:	*DC 5.8V(with a adapter input AC 120V/60Hz)*

Test Specification:	*Horizontal*

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT: "18AR016E16_red"

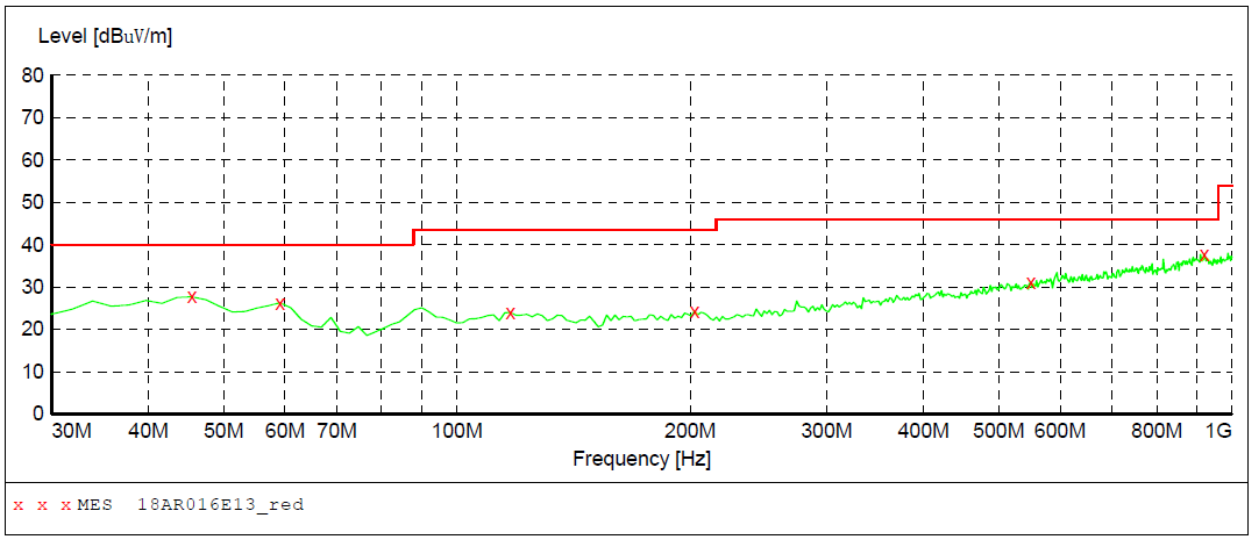
2018-2-16 02:05PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	27.90	16.8	40.0	12.1	---	100.0	0.00	HORIZONTAL
61.040000	26.30	14.9	40.0	13.7	---	100.0	0.00	HORIZONTAL
86.260000	25.00	12.9	40.0	15.0	---	100.0	0.00	HORIZONTAL
200.720000	24.70	14.0	43.5	18.8	---	100.0	0.00	HORIZONTAL
511.120000	32.30	19.6	46.0	13.7	---	100.0	0.00	HORIZONTAL
935.980000	37.70	25.5	46.0	8.3	---	100.0	0.00	HORIZONTAL

Test Specification: *Vertical*

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT: "18AR016E13_red"

2018-2-16 02:00PM

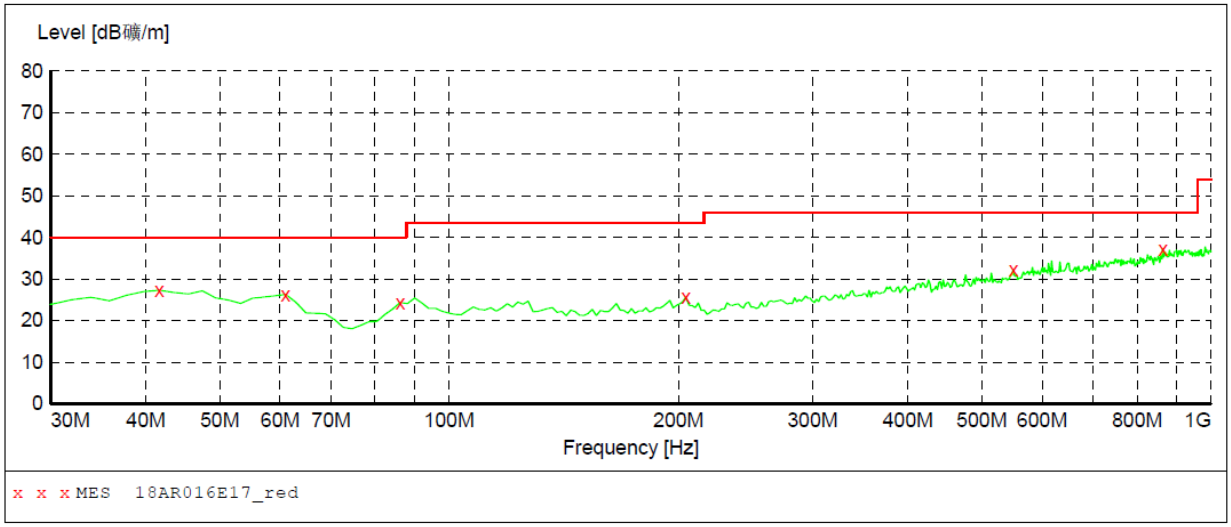
Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	27.70	16.8	40.0	12.3	---	100.0	0.00	VERTICAL
59.100000	26.30	15.7	40.0	13.7	---	100.0	0.00	VERTICAL
117.300000	24.00	12.9	43.5	19.5	---	100.0	0.00	VERTICAL
202.660000	24.30	14.0	43.5	19.2	---	100.0	0.00	VERTICAL
549.920000	31.00	20.5	46.0	15.0	---	100.0	0.00	VERTICAL
920.460000	37.80	25.7	46.0	8.2	---	100.0	0.00	VERTICAL

Operating Condition: *8DPSK Transmitting Middle Channel (2441MHz)*
Comment: *DC 5.8V(with a adapter input AC 120V/60Hz)*

Test Specification: *Horizontal*

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT: "18AR016E17_red"

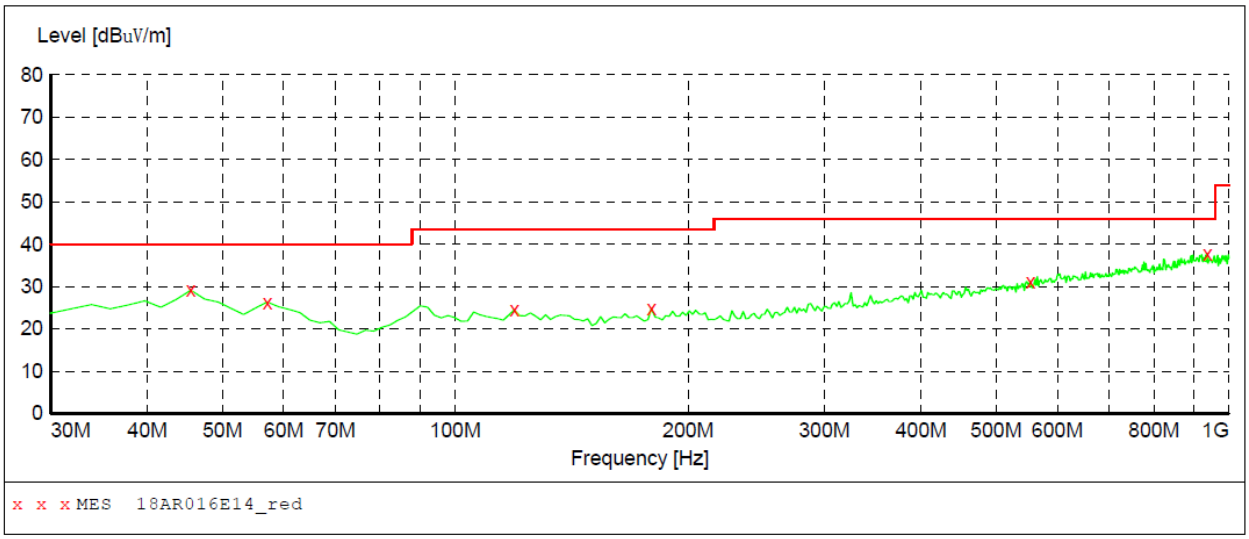
2018-2-16 02:06PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
41.640000	27.30	15.4	40.0	12.7	---	100.0	0.00	HORIZONTAL
61.040000	26.30	14.9	40.0	13.7	---	100.0	0.00	HORIZONTAL
86.260000	24.30	12.9	40.0	15.7	---	100.0	0.00	HORIZONTAL
204.600000	25.60	14.1	43.5	17.9	---	100.0	0.00	HORIZONTAL
549.920000	32.10	20.5	46.0	13.9	---	100.0	0.00	HORIZONTAL
864.200000	37.30	24.8	46.0	8.7	---	100.0	0.00	HORIZONTAL

Test Specification: *Vertical*

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT: "18AR016E14_red"

2018-2-16 02:02PM

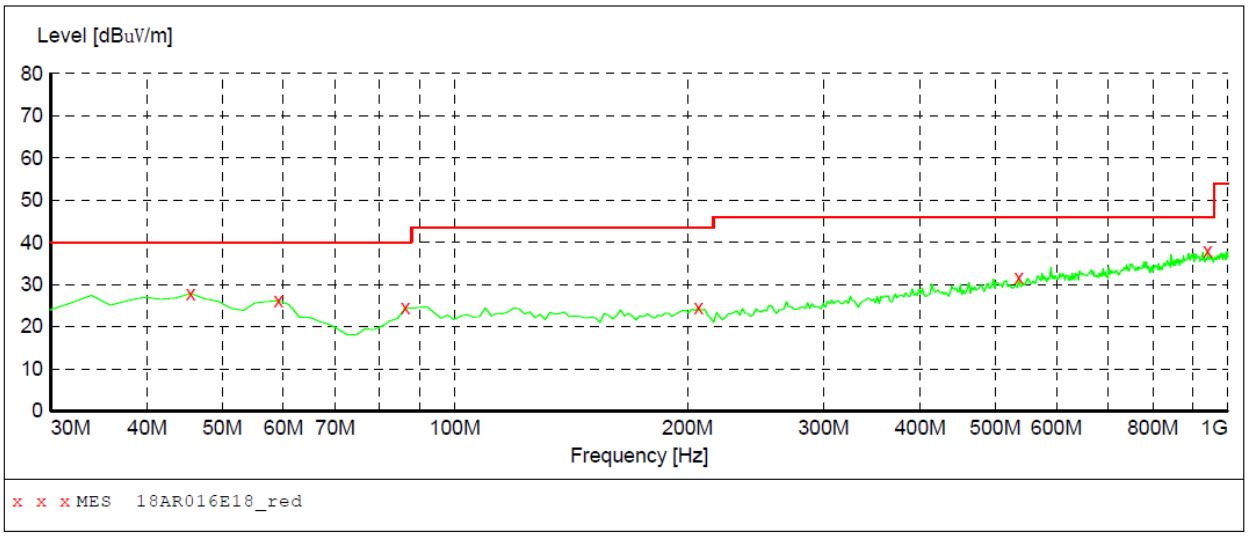
Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	29.10	16.8	40.0	10.9	---	100.0	0.00	VERTICAL
57.160000	26.30	15.7	40.0	13.7	---	100.0	0.00	VERTICAL
119.240000	24.50	13.2	43.5	19.0	---	100.0	0.00	VERTICAL
179.380000	24.80	12.6	43.5	18.7	---	100.0	0.00	VERTICAL
553.800000	31.20	20.4	46.0	14.8	---	100.0	0.00	VERTICAL
937.920000	37.80	25.4	46.0	8.2	---	100.0	0.00	VERTICAL

Operating Condition: *8DPSK Transmitting High Channel (2480MHz)*
Comment: *DC 5.8V(with a adapter input AC 120V/60Hz)*

Test Specification: *Horizontal*

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT: "18AR016E18_red"

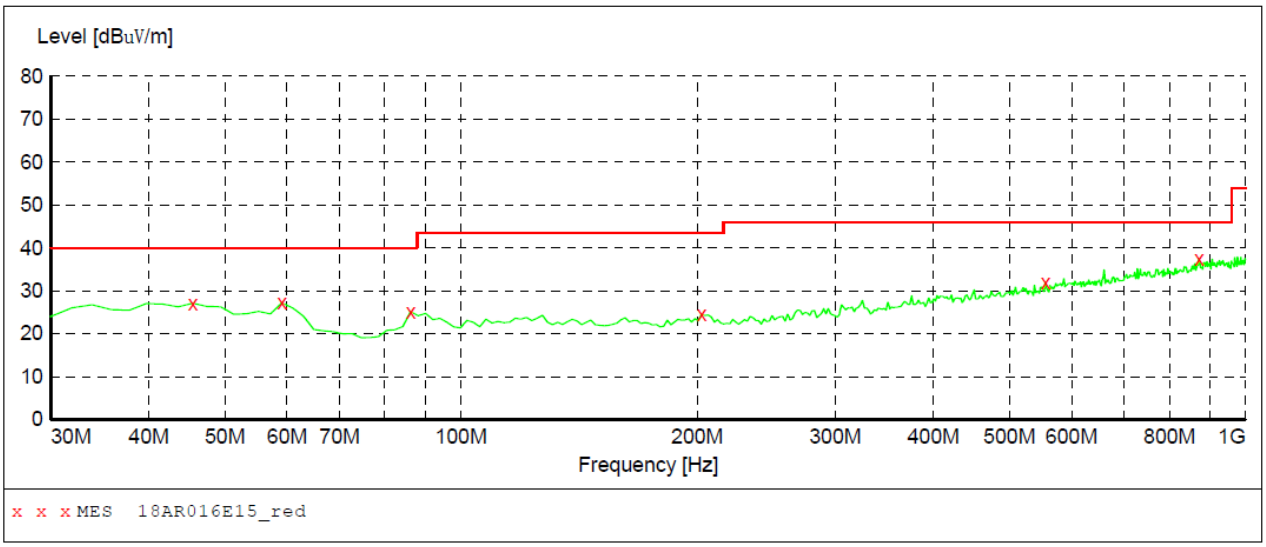
2018-2-16 02:07PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	27.90	16.8	40.0	12.1	---	100.0	0.00	HORIZONTAL
59.100000	26.20	15.7	40.0	13.8	---	100.0	0.00	HORIZONTAL
86.260000	24.40	12.9	40.0	15.6	---	100.0	0.00	HORIZONTAL
206.540000	24.60	14.1	43.5	18.9	---	100.0	0.00	HORIZONTAL
536.340000	31.60	19.6	46.0	14.4	---	100.0	0.00	HORIZONTAL
941.800000	37.90	25.3	46.0	8.1	---	100.0	0.00	HORIZONTAL

Test Specification: *Vertical*

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT: "18AR016E15_red"

2018-2-16 02:03PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarizatio
45.520000	27.10	16.8	40.0	12.9	---	100.0	0.00	VERTICAL
59.100000	27.20	15.7	40.0	12.8	---	100.0	0.00	VERTICAL
86.260000	25.10	12.9	40.0	14.9	---	100.0	0.00	VERTICAL
202.660000	24.50	14.0	43.5	19.0	---	100.0	0.00	VERTICAL
555.740000	31.90	20.4	46.0	14.1	---	100.0	0.00	VERTICAL
871.960000	37.40	25.0	46.0	8.6	---	100.0	0.00	VERTICAL

Spurious Emissions Above 1GHz (GFSK)

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2402MHz							
4804	55.94	-3.59	52.35	74	-21.65	H	PK
4804	44.82	-3.59	41.23	54	-12.77	H	AV
7206	50.82	-0.52	50.30	74	-23.70	H	PK
7206	40.36	-0.52	39.84	54	-14.16	H	AV
4804	56.72	-3.59	53.13	74	-20.87	V	PK
4804	45.89	-3.59	42.30	54	-11.70	V	AV
7206	51.99	-0.52	51.47	74	-22.53	V	PK
7206	44.35	-0.52	43.83	54	-10.17	V	AV
Middle Channel-2441MHz							
4884	57.36	-3.49	53.87	74	-20.13	H	PK
4884	46.14	-3.49	42.65	54	-11.35	H	AV
7326	50.60	-0.47	50.13	74	-23.87	H	PK
7326	41.12	-0.47	40.65	54	-13.35	H	AV
4884	53.83	-3.49	50.34	74	-23.66	V	PK
4884	43.59	-3.49	40.10	54	-13.90	V	AV
7326	51.78	-0.47	51.31	74	-22.69	V	PK
7326	41.58	-0.47	41.11	54	-12.89	V	AV
High Channel-2480MHz							
4960	56.62	-3.41	53.21	74	-20.79	H	PK
4960	45.61	-3.41	42.20	54	-11.80	H	AV
7440	50.87	-0.42	50.45	74	-23.55	H	PK
7440	42.02	-0.42	41.60	54	-12.40	H	AV
4960	54.66	-3.41	51.25	74	-22.75	V	PK
4960	44.54	-3.41	41.13	54	-12.87	V	AV
7440	52.72	-0.42	52.30	74	-21.70	V	PK
7440	41.32	-0.42	40.90	54	-13.10	V	AV

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Spurious Emissions Above 1GHz (Pi/4 DQPSK)

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2402MHz							
4804	57.52	-3.59	53.93	74	-20.07	H	PK
4804	46.4	-3.59	42.81	54	-11.19	H	AV
7206	52.4	-0.52	51.88	74	-22.12	H	PK
7206	41.94	-0.52	41.42	54	-12.58	H	AV
4804	58.3	-3.59	54.71	74	-19.29	V	PK
4804	47.47	-3.59	43.88	54	-10.12	V	AV
7206	53.57	-0.52	53.05	74	-20.95	V	PK
7206	45.93	-0.52	45.41	54	-8.59	V	AV
Middle Channel-2441MHz							
4884	58.94	-3.49	55.45	74	-18.55	H	PK
4884	47.72	-3.49	44.23	54	-9.77	H	AV
7326	52.18	-0.47	51.71	74	-22.29	H	PK
7326	42.7	-0.47	42.23	54	-11.77	H	AV
4884	55.41	-3.49	51.92	74	-22.08	V	PK
4884	45.17	-3.49	41.68	54	-12.32	V	AV
7326	53.36	-0.47	52.89	74	-21.11	V	PK
7326	43.16	-0.47	42.69	54	-11.31	V	AV
High Channel-2480MHz							
4960	58.2	-3.41	54.79	74	-19.21	H	PK
4960	47.19	-3.41	43.78	54	-10.22	H	AV
7440	52.45	-0.42	52.03	74	-21.97	H	PK
7440	43.6	-0.42	43.18	54	-10.82	H	AV
4960	56.24	-3.41	52.83	74	-21.17	V	PK
4960	46.12	-3.41	42.71	54	-11.29	V	AV
7440	54.3	-0.42	53.88	74	-20.12	V	PK
7440	42.9	-0.42	42.48	54	-11.52	V	AV

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Spurious Emissions Above 1GHz (8DPSK)

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2402MHz							
4804	58.15	-3.59	54.56	74	-19.44	H	PK
4804	47.03	-3.59	43.44	54	-10.56	H	AV
7206	53.03	-0.52	52.51	74	-21.49	H	PK
7206	42.57	-0.52	42.05	54	-11.95	H	AV
4804	58.93	-3.59	55.34	74	-18.66	V	PK
4804	48.1	-3.59	44.51	54	-9.49	V	AV
7206	54.2	-0.52	53.68	74	-20.32	V	PK
7206	46.56	-0.52	46.04	54	-7.96	V	AV
Middle Channel-2441MHz							
4884	59.57	-3.49	56.08	74	-17.92	H	PK
4884	48.35	-3.49	44.86	54	-9.14	H	AV
7326	52.81	-0.47	52.34	74	-21.66	H	PK
7326	43.33	-0.47	42.86	54	-11.14	H	AV
4884	56.04	-3.49	52.55	74	-21.45	V	PK
4884	45.8	-3.49	42.31	54	-11.69	V	AV
7326	53.99	-0.47	53.52	74	-20.48	V	PK
7326	43.79	-0.47	43.32	54	-10.68	V	AV
High Channel-2480MHz							
4960	58.83	-3.41	55.42	74	-18.58	H	PK
4960	47.82	-3.41	44.41	54	-9.59	H	AV
7440	53.08	-0.42	52.66	74	-21.34	H	PK
7440	44.23	-0.42	43.81	54	-10.19	H	AV
4960	56.87	-3.41	53.46	74	-20.54	V	PK
4960	46.75	-3.41	43.34	54	-10.66	V	AV
7440	54.93	-0.42	54.51	74	-19.49	V	PK
7440	43.53	-0.42	43.11	54	-10.89	V	AV

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

11. Out of Band Emissions

11.1 Standard Applicable

According to §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).

11.2 Test Procedure

According to ANSI C63.10-2013 section 7.8.6, the Band-edge measurements for RF conducted emissions test method as follows.

a) Connect the EMI receiver or spectrum analyzer to the EUT using an appropriate RF cable connected to the EUT output. Configure the spectrum analyzer settings as described in step e) (be sure to enter all losses between the unlicensed wireless device output and the spectrum analyzer).
b) Set the EUT to the lowest frequency channel (for the hopping on test, the hopping sequence shall include the lowest frequency channel).
c) Set the EUT to operate at maximum output power and 100% duty cycle, or equivalent “normal mode of operation” as specified in 6.10.3.
d) If using the radiated method, then use the applicable procedure(s) of 6.4, 6.5, or 6.6, and orient the EUT and measurement antenna positions to produce the highest emission level.
e) Perform the test as follows:

1) Span: Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products that fall outside of the authorized band of operation.
2) Reference level: As required to keep the signal from exceeding the maximum instrument input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.
3) Attenuation: Auto (at least 10 dB preferred).
4) Sweep time: Coupled.
5) Resolution bandwidth: 100 kHz.
6) Video bandwidth: 300 kHz.
7) Detector: Peak.
8) Trace: Max hold.

f) Allow the trace to stabilize. For the test with the hopping function turned ON, this can take several minutes to achieve a reasonable probability of intercepting any emissions due to oscillator overshoot.
g) Set the marker on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge. Enable the marker-delta function, and then use the marker-to-peak

function to move the marker to the peak of the in-band emission.
h) Repeat step c) through step e) for every applicable modulation.
i) Set the EUT to the highest frequency channel (for the hopping on test, the hopping sequence shall include the highest frequency channel) and repeat step c) through step d).
j) The band-edge measurement shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

Restricted-band band-edge test method please refers to ANSI C63.10-2013 section 6.10.5. The emission must comply with the 15.209 limit for fall in the restricted bands listed in section 15.205. Note that the method of measurement KDB publication number: 913591 may be used for the radiated band-edge measurements.

According to ANSI C63.10-2013 section 7.8.8, Conducted spurious emissions shall be measured for the transmit frequency, per 5.5 and 5.6, and at the maximum transmit powers.
Connect the primary antenna port through an attenuator to the spectrum analyzer input; in the results, account for all losses between the unlicensed wireless device output and the spectrum analyzer. The instrument shall span 30 MHz to 10 times the operating frequency in GHz, with a resolution bandwidth of 100 kHz, video bandwidth of 300 kHz, and a coupled sweep time with a peak detector. The band 30 MHz to the highest frequency may be split into smaller spans, as long as the entire spectrum is covered.

11.3 Environmental Conditions

Temperature:	23°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

11.4 Summary of Test Results/Plots

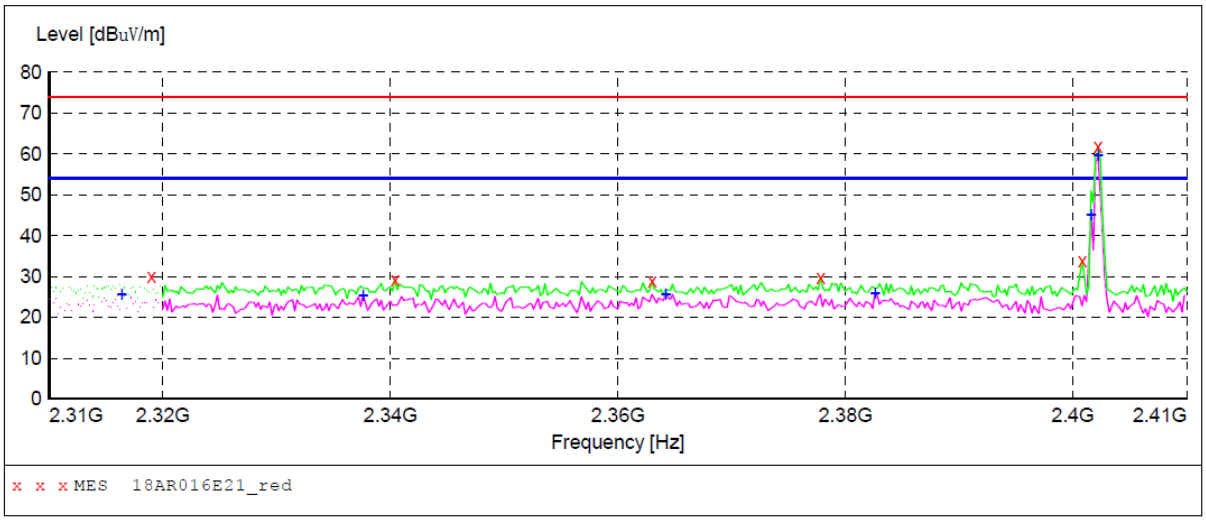
Band edge (Radiated)

Lowest Band edge

Horizontal (GFSK)

SWEEP TABLE: "test (1M-7G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	7.0 GHz	MaxPeak Average	Coupled	100 kHz	BBHA 9120A NEW



MEASUREMENT RESULT: "18AR016E21_red"

2018-2-16 02:28PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
2319.000000	29.90	-4.1	74.0	44.1	---	100.0	0.00	HORIZONTAL
2340.400000	29.20	-4.1	74.0	44.8	---	100.0	0.00	HORIZONTAL
2363.000000	28.80	-4.1	74.0	45.2	---	100.0	0.00	HORIZONTAL
2377.800000	29.80	-4.1	74.0	44.2	---	100.0	0.00	HORIZONTAL
2400.800000	33.90	-4.0	74.0	40.1	---	100.0	0.00	HORIZONTAL
2402.200000	61.70	-4.0	74.0	12.3	---	100.0	0.00	HORIZONTAL

MEASUREMENT RESULT: "18AR016E21_red2"

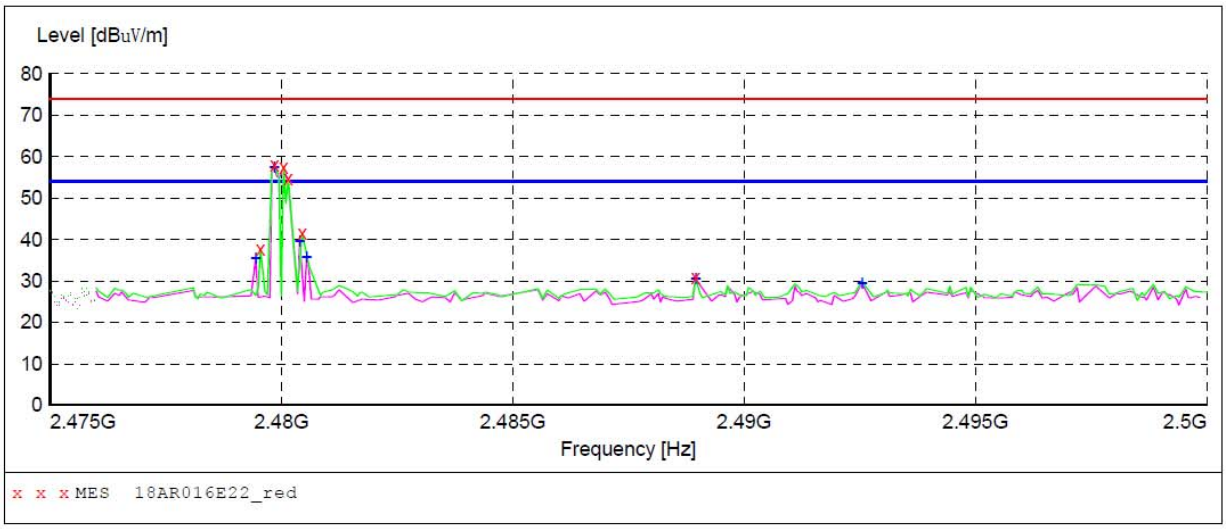
2018-2-16 02:28PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
2316.400000	25.50	-4.1	54.0	28.5	---	100.0	0.00	HORIZONTAL
2337.600000	25.40	-4.1	54.0	28.6	---	100.0	0.00	HORIZONTAL
2364.200000	25.70	-4.1	54.0	28.3	---	100.0	0.00	HORIZONTAL
2382.600000	25.80	-4.1	54.0	28.2	---	100.0	0.00	HORIZONTAL
2401.600000	45.10	-4.0	54.0	8.9	---	100.0	0.00	HORIZONTAL
2402.200000	59.60	-4.0	54.0	-5.6	---	100.0	0.00	HORIZONTAL

Highest Bandedge
Horizontal (GFSK)

SWEEP TABLE: "test (1M-7G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	7.0 GHz	MaxPeak Average	Coupled	100 kHz	BBHA 9120A NEW



MEASUREMENT RESULT: "18AR016E22_red"

2018-2-16 02:38PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
2479.550000	37.60	-3.4	74.0	36.4	---	100.0	0.00	HORIZONTAL
2479.850000	58.00	-3.4	74.0	16.0	---	100.0	0.00	HORIZONTAL
2480.050000	57.40	-3.4	74.0	16.6	---	100.0	0.00	HORIZONTAL
2480.150000	54.80	-3.4	74.0	19.2	---	100.0	0.00	HORIZONTAL
2480.450000	41.50	-3.4	74.0	32.5	---	100.0	0.00	HORIZONTAL
2488.950000	30.80	-3.3	74.0	43.2	---	100.0	0.00	HORIZONTAL

MEASUREMENT RESULT: "18AR016E22_red2"

2018-2-16 02:38PM

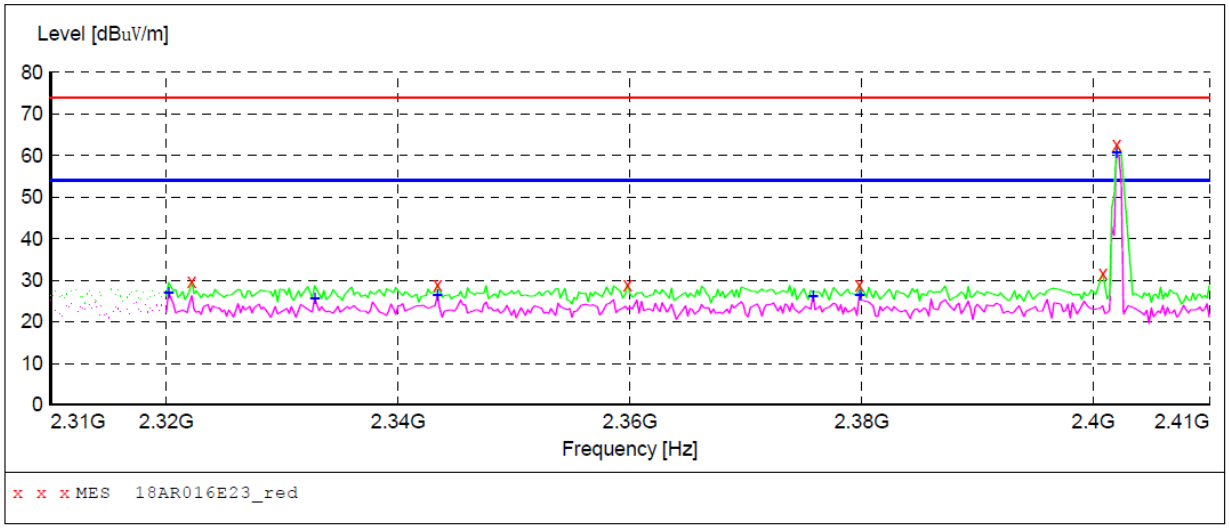
Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
2479.450000	35.40	-3.4	54.0	18.6	---	100.0	0.00	HORIZONTAL
2479.850000	57.40	-3.4	54.0	-3.4	---	100.0	0.00	HORIZONTAL
2480.400000	39.60	-3.4	54.0	14.4	---	100.0	0.00	HORIZONTAL
2480.550000	35.80	-3.4	54.0	18.2	---	100.0	0.00	HORIZONTAL
2488.950000	30.40	-3.3	54.0	23.6	---	100.0	0.00	HORIZONTAL
2492.550000	29.50	-3.3	54.0	24.5	---	100.0	0.00	HORIZONTAL

Lowest Band edge

Horizontal (Pi/4 DQPSK)

SWEEP TABLE: "test (1M-7G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	7.0 GHz	MaxPeak Average	Coupled	100 kHz	BBHA 9120A NEW



MEASUREMENT RESULT: "18AR016E23_red"

2018-2-16 02:31PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
2322.200000	29.60	-4.1	74.0	44.4	---	100.0	0.00	HORIZONTAL
2343.400000	29.00	-4.1	74.0	45.0	---	100.0	0.00	HORIZONTAL
2359.800000	29.00	-4.1	74.0	45.0	---	100.0	0.00	HORIZONTAL
2379.800000	29.00	-4.1	74.0	45.0	---	100.0	0.00	HORIZONTAL
2400.800000	31.60	-4.0	74.0	42.4	---	100.0	0.00	HORIZONTAL
2402.000000	62.50	-4.0	74.0	11.5	---	100.0	0.00	HORIZONTAL

MEASUREMENT RESULT: "18AR016E23_red2"

2018-2-16 02:31PM

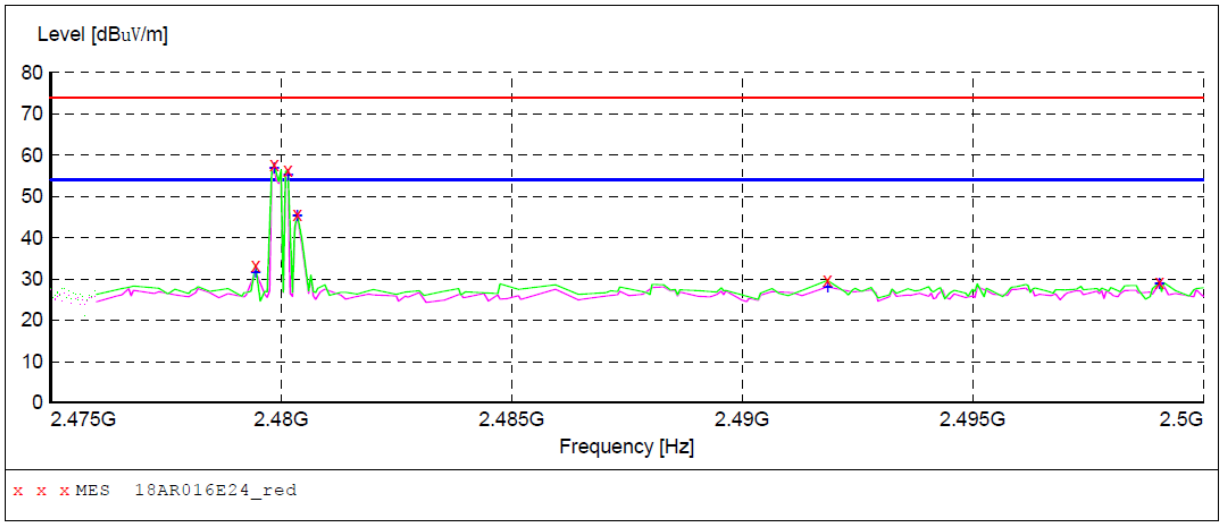
Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
2320.200000	27.00	-4.1	54.0	27.0	---	100.0	0.00	HORIZONTAL
2332.800000	25.60	-4.1	54.0	28.4	---	100.0	0.00	HORIZONTAL
2343.400000	26.40	-4.1	54.0	27.6	---	100.0	0.00	HORIZONTAL
2375.800000	26.30	-4.1	54.0	27.7	---	100.0	0.00	HORIZONTAL
2379.800000	26.50	-4.1	54.0	27.5	---	100.0	0.00	HORIZONTAL
2402.000000	60.60	-4.0	54.0	-6.6	---	100.0	0.00	HORIZONTAL

Highest Bandedge

Horizontal (Pi/4 DQPSK)

SWEEP TABLE: "test (1M-7G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	7.0 GHz	MaxPeak Average	Coupled	100 kHz	BBHA 9120A NEW



MEASUREMENT RESULT: "18AR016E24_red"

2018-2-16 02:41PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
2479.450000	33.20	-3.4	74.0	40.8	---	100.0	0.00	HORIZONTAL
2479.850000	57.70	-3.4	74.0	16.3	---	100.0	0.00	HORIZONTAL
2480.150000	56.20	-3.4	74.0	17.8	---	100.0	0.00	HORIZONTAL
2480.350000	45.60	-3.4	74.0	28.4	---	100.0	0.00	HORIZONTAL
2491.850000	29.60	-3.3	74.0	44.4	---	100.0	0.00	HORIZONTAL
2499.050000	29.10	-3.2	74.0	44.9	---	100.0	0.00	HORIZONTAL

MEASUREMENT RESULT: "18AR016E24_red2"

2018-2-16 02:41PM

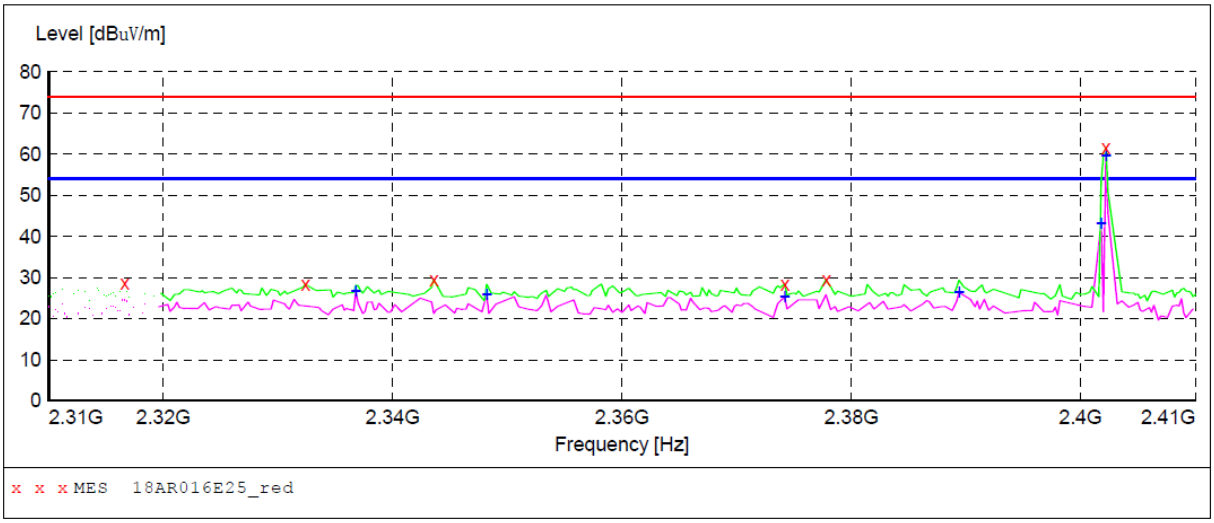
Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
2479.450000	31.70	-3.4	54.0	22.3	---	100.0	0.00	HORIZONTAL
2479.850000	56.90	-3.4	54.0	-2.9	---	100.0	0.00	HORIZONTAL
2480.150000	55.20	-3.4	54.0	-1.2	---	100.0	0.00	HORIZONTAL
2480.350000	45.40	-3.4	54.0	8.6	---	100.0	0.00	HORIZONTAL
2491.850000	28.10	-3.3	54.0	25.9	---	100.0	0.00	HORIZONTAL
2499.050000	29.00	-3.2	54.0	25.0	---	100.0	0.00	HORIZONTAL

Lowest Band edge

Horizontal (8DPSK)

SWEEP TABLE: "test (1M-7G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	7.0 GHz	MaxPeak Average	Coupled	100 kHz	BBHA 9120A NEW



MEASUREMENT RESULT: "18AR016E25_red"

2018-2-16 02:33PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
2316.600000	28.60	-4.1	74.0	45.4	---	100.0	0.00	HORIZONTAL
2332.400000	28.30	-4.1	74.0	45.7	---	100.0	0.00	HORIZONTAL
2343.600000	29.50	-4.1	74.0	44.5	---	100.0	0.00	HORIZONTAL
2374.200000	28.40	-4.1	74.0	45.6	---	100.0	0.00	HORIZONTAL
2377.800000	29.50	-4.1	74.0	44.5	---	100.0	0.00	HORIZONTAL
2402.200000	61.60	-4.0	74.0	12.4	---	100.0	0.00	HORIZONTAL

MEASUREMENT RESULT: "18AR016E25_red2"

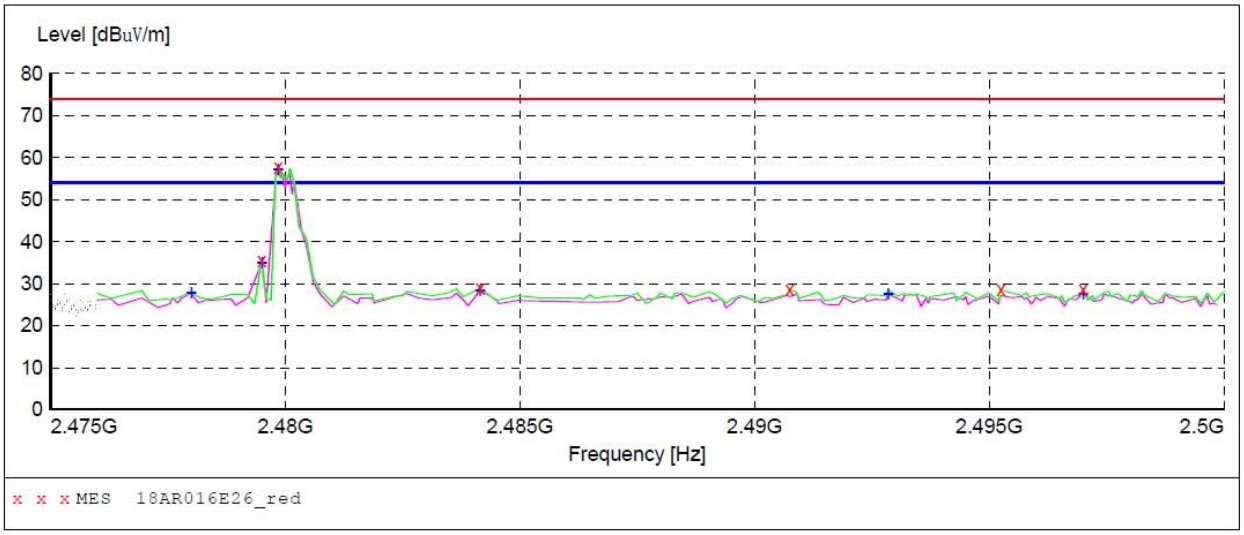
2018-2-16 02:33PM

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
2336.800000	26.60	-4.1	54.0	27.4	---	100.0	0.00	HORIZONTAL
2348.200000	25.90	-4.1	54.0	28.1	---	100.0	0.00	HORIZONTAL
2374.200000	25.30	-4.1	54.0	28.7	---	100.0	0.00	HORIZONTAL
2389.400000	26.40	-4.1	54.0	27.6	---	100.0	0.00	HORIZONTAL
2401.800000	43.10	-4.0	54.0	10.9	---	100.0	0.00	HORIZONTAL
2402.200000	59.50	-4.0	54.0	-5.5	---	100.0	0.00	HORIZONTAL

Highest Bandedge
Horizontal (8DPSK)

SWEEP TABLE: "test (1M-7G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	7.0 GHz	MaxPeak Average	Coupled	100 kHz	BBHA 9120A NEW



MEASUREMENT RESULT: "18AR016E26_red"

2018-2-16 02:42PM

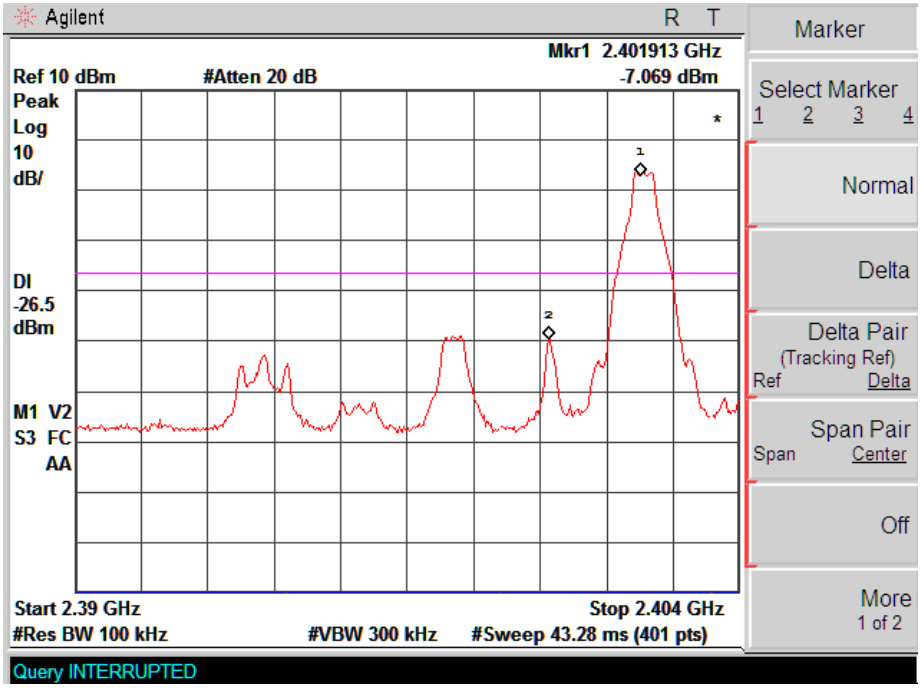
Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
2479.500000	35.60	-3.4	74.0	38.4	---	100.0	0.00	HORIZONTAL
2479.850000	57.80	-3.4	74.0	16.2	---	100.0	0.00	HORIZONTAL
2484.150000	28.90	-3.3	74.0	45.1	---	100.0	0.00	HORIZONTAL
2490.750000	28.70	-3.3	74.0	45.3	---	100.0	0.00	HORIZONTAL
2495.250000	28.60	-3.2	74.0	45.4	---	100.0	0.00	HORIZONTAL
2497.000000	28.50	-3.2	74.0	45.5	---	100.0	0.00	HORIZONTAL

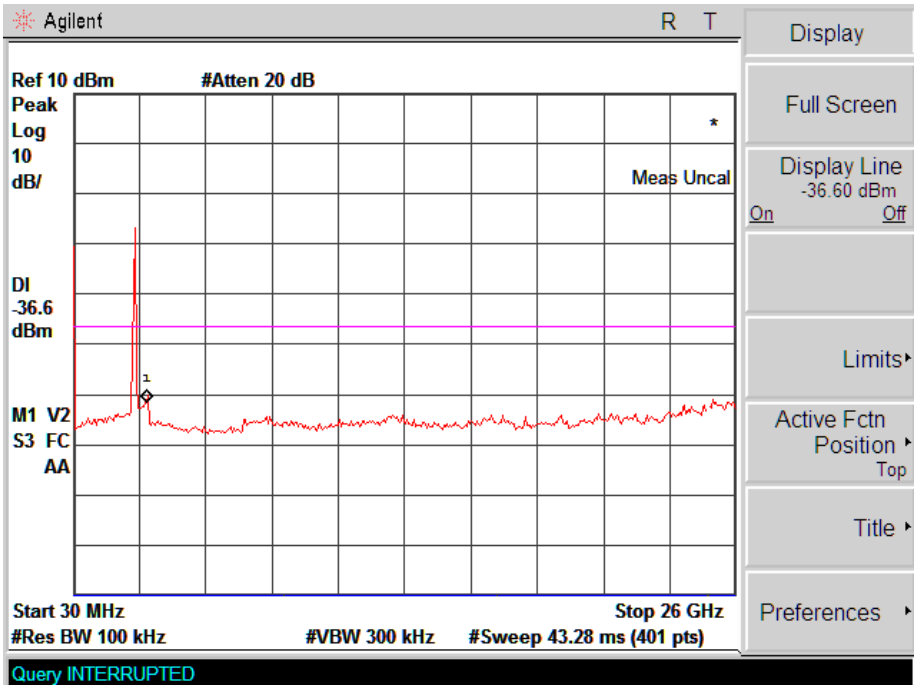
MEASUREMENT RESULT: "18AR016E26_red2"

2018-2-16 02:42PM

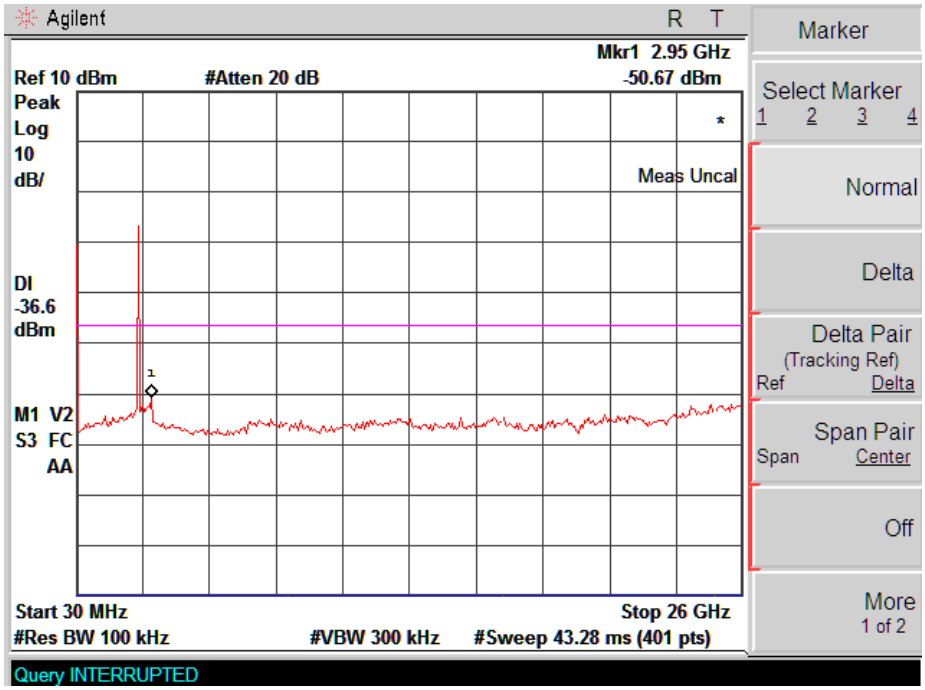
Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
2478.000000	27.70	-3.4	54.0	26.3	---	100.0	0.00	HORIZONTAL
2479.500000	34.80	-3.4	54.0	19.2	---	100.0	0.00	HORIZONTAL
2479.850000	57.00	-3.4	54.0	-3.0	---	100.0	0.00	HORIZONTAL
2484.150000	28.30	-3.3	54.0	25.7	---	100.0	0.00	HORIZONTAL
2492.850000	27.50	-3.3	54.0	26.5	---	100.0	0.00	HORIZONTAL
2497.000000	27.60	-3.2	54.0	26.4	---	100.0	0.00	HORIZONTAL

Band edge (Conducted)
Lowest (GFSK)

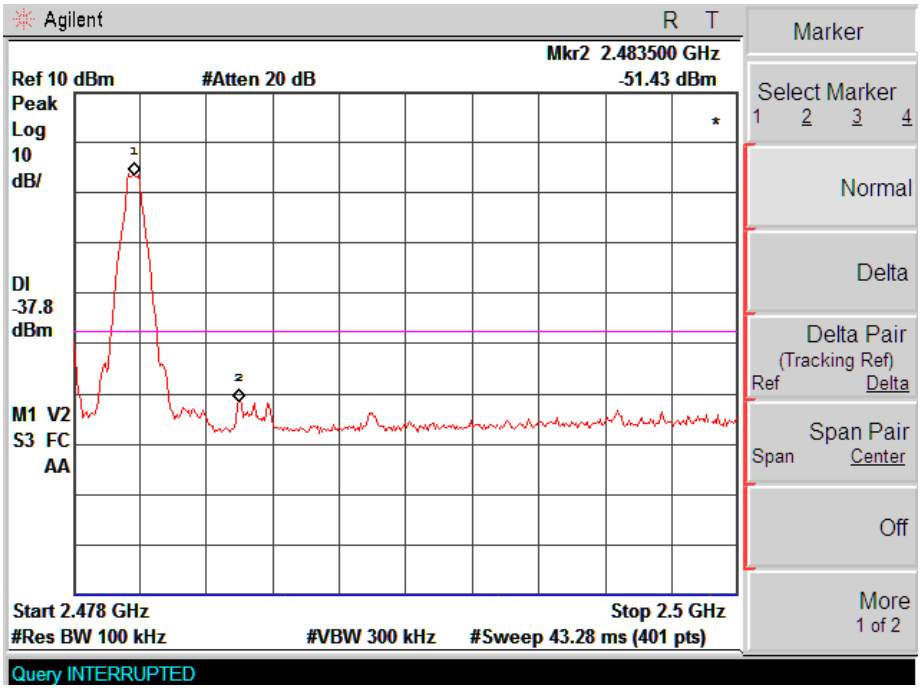


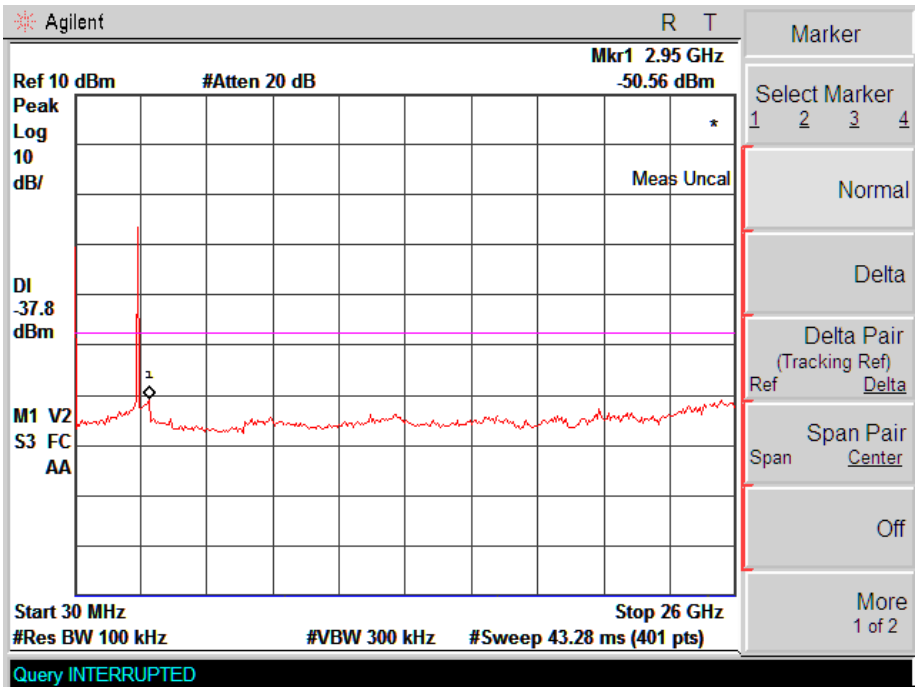


Middle Channel

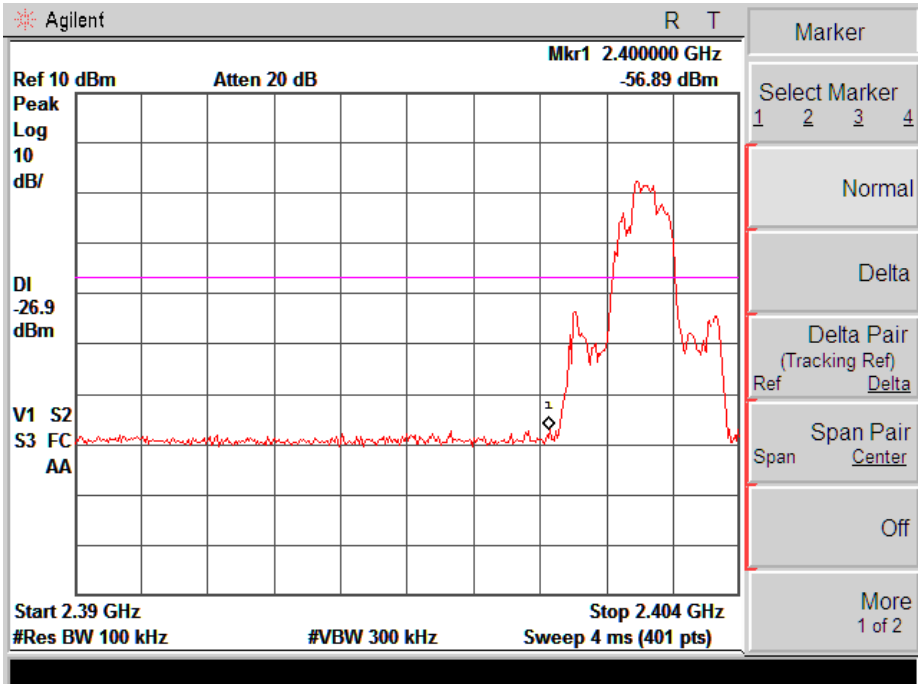


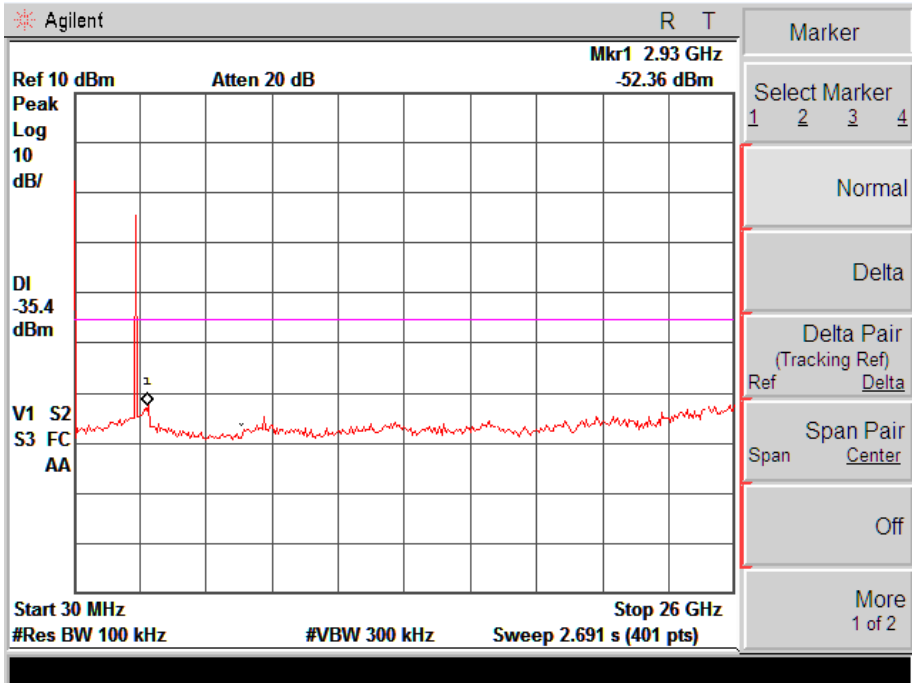
Highest


Agilent
R T
Mkr2 2.483500 GHz
Ref 10 dBm
#Atten 20 dB
-51.43 dBm
Peak
Log
10
dB/
DI
-37.8
dBm
M1 V2
S3 FC
AA
Start 2.478 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.5 GHz
#Sweep 43.28 ms (401 pts)
Query INTERRUPTED
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

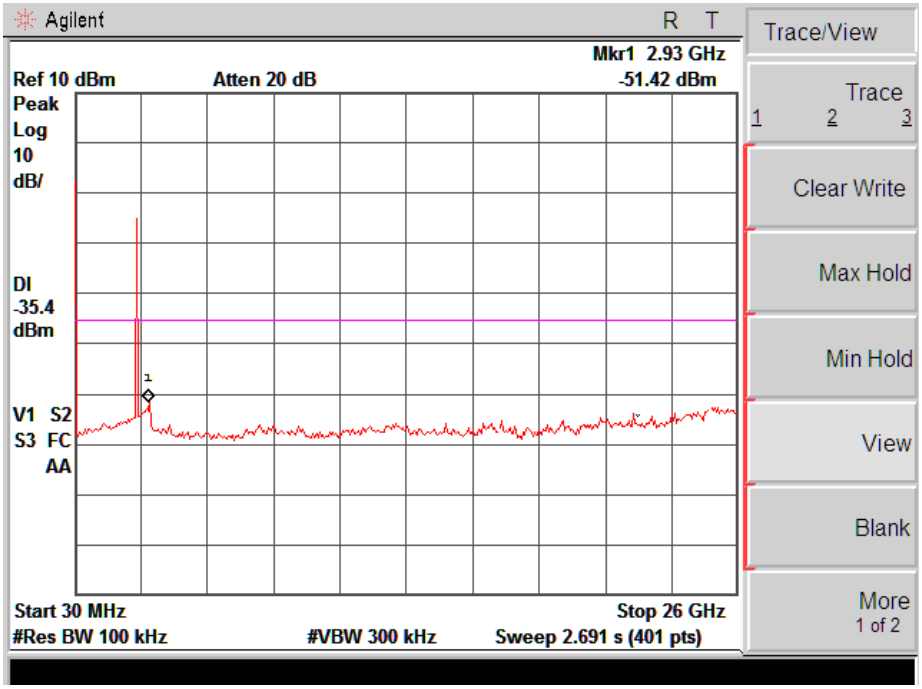

Agilent
R T
Mkr1 2.95 GHz
Ref 10 dBm
#Atten 20 dB
-50.56 dBm
Peak
Log
10
dB/
Meas Uncal
DI
-37.8
dBm
M1 V2
S3 FC
AA
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26 GHz
#Sweep 43.28 ms (401 pts)
Query INTERRUPTED
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

Band edge (Conducted)
Lowest (Pi/4 DQPSK)

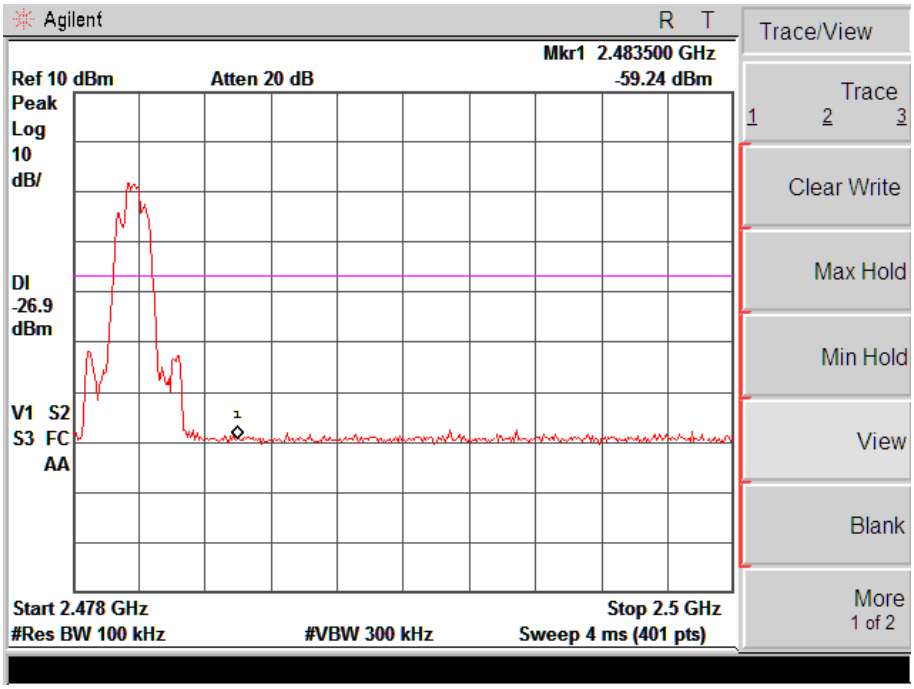


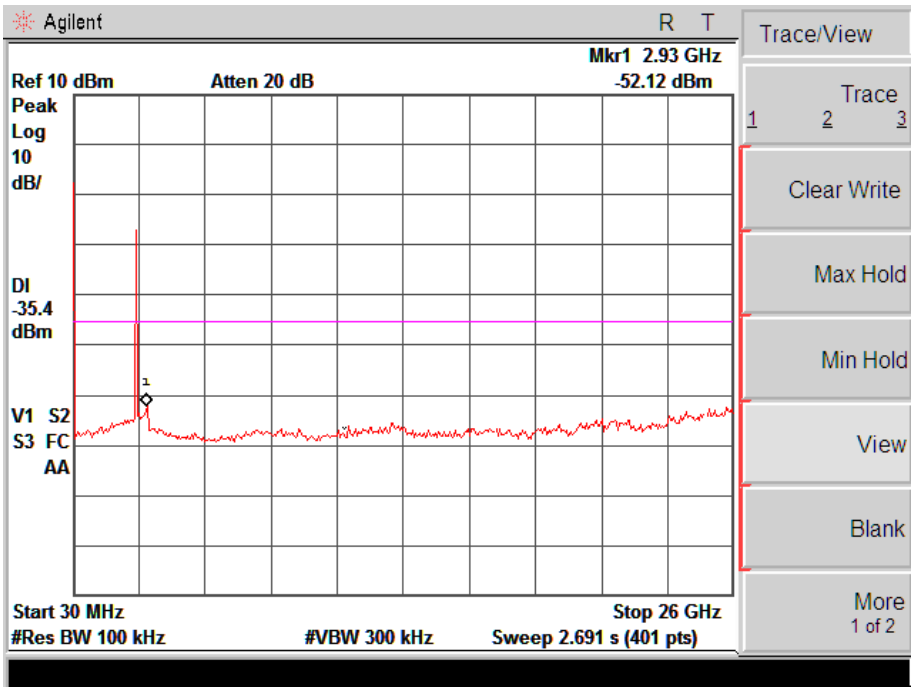


Middle Channel

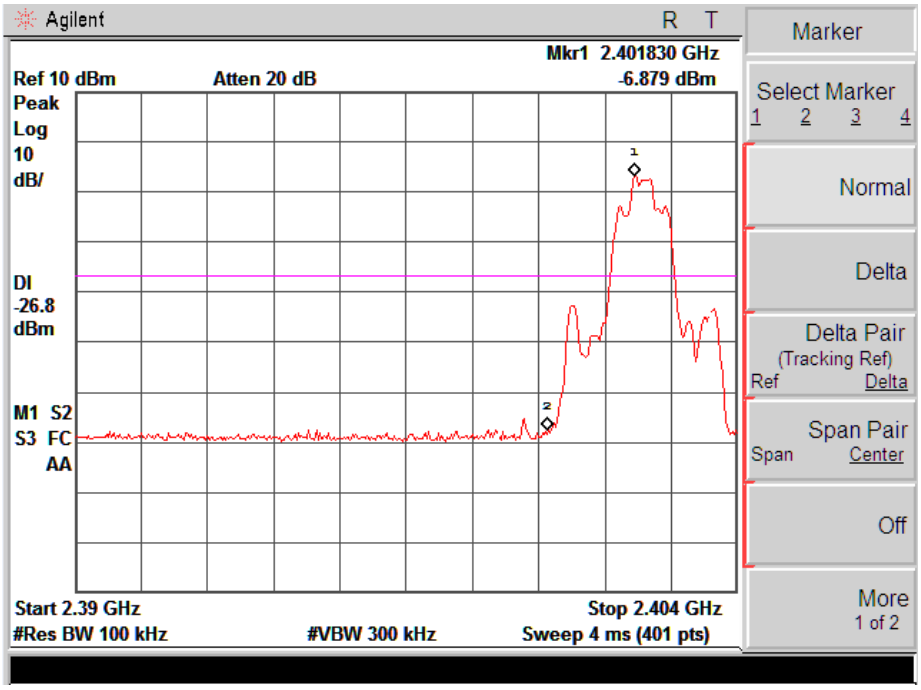


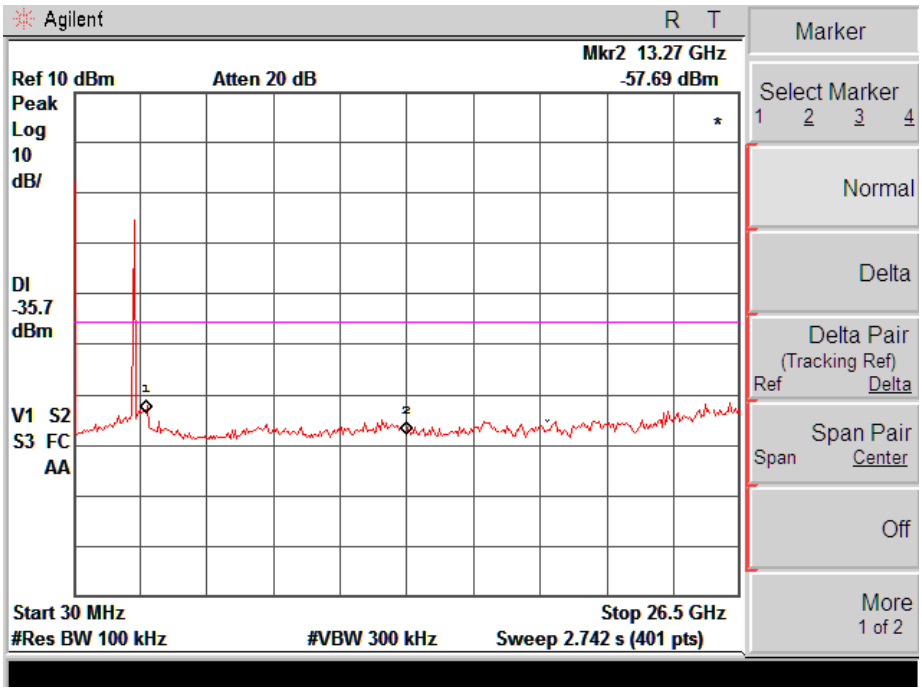
Highest


Agilent
R T
Mkr1 2.483500 GHz
Ref 10 dBm
Atten 20 dB
-59.24 dBm
Peak
Log
10
dB/
DI
-26.9
dBm
V1 S2
S3 FC
AA
Start 2.478 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.5 GHz
Sweep 4 ms (401 pts)
Trace/View
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2

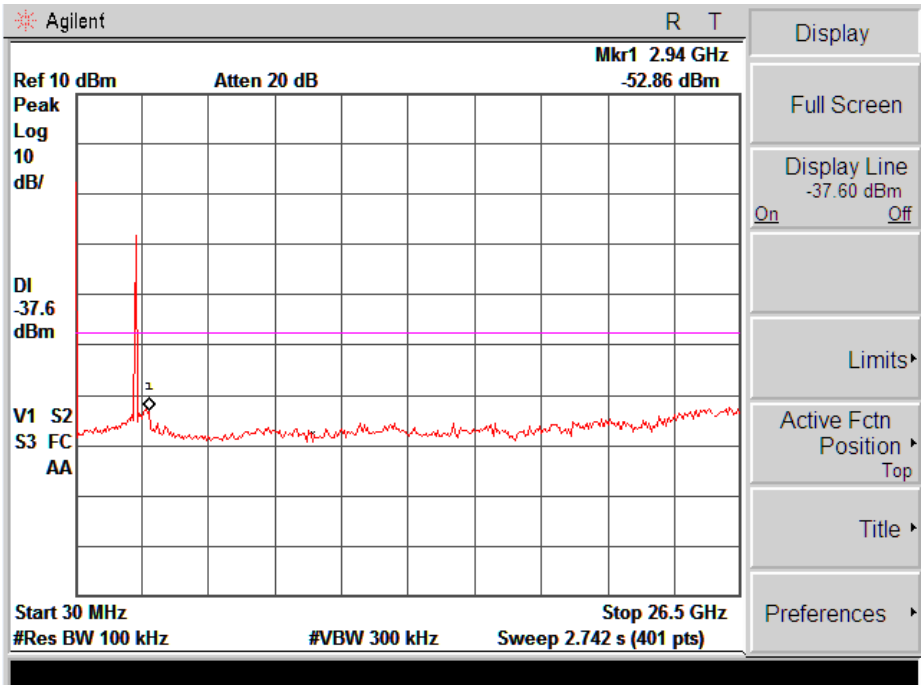

Agilent
R T
Mkr1 2.93 GHz
Ref 10 dBm
Atten 20 dB
-52.12 dBm
Peak
Log
10
dB/
DI
-35.4
dBm
V1 S2
S3 FC
AA
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26 GHz
Sweep 2.691 s (401 pts)
Trace/View
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2

Bandedge (Conducted)
Lowest (8DPSK)

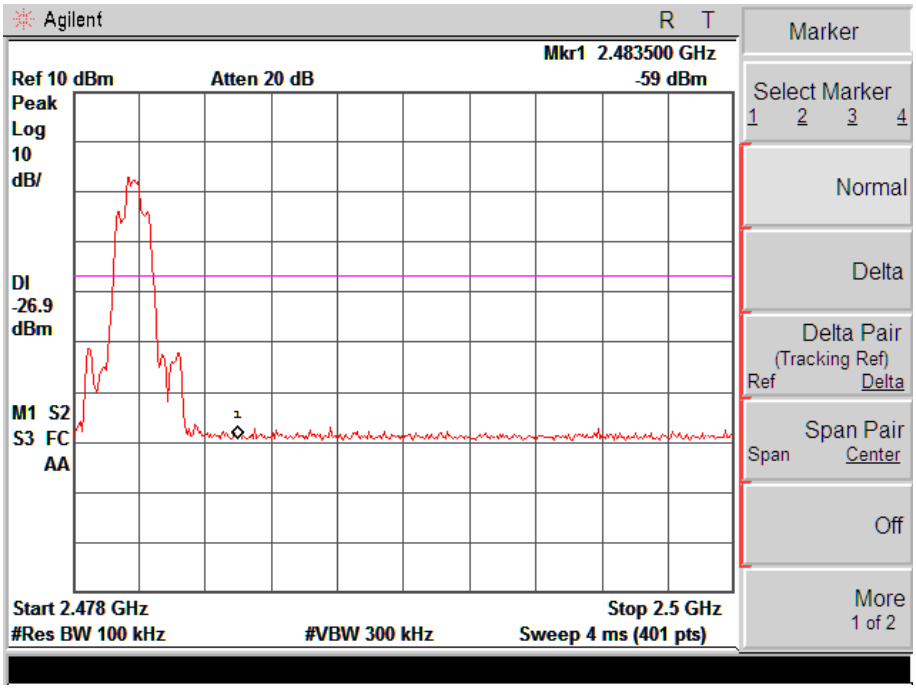


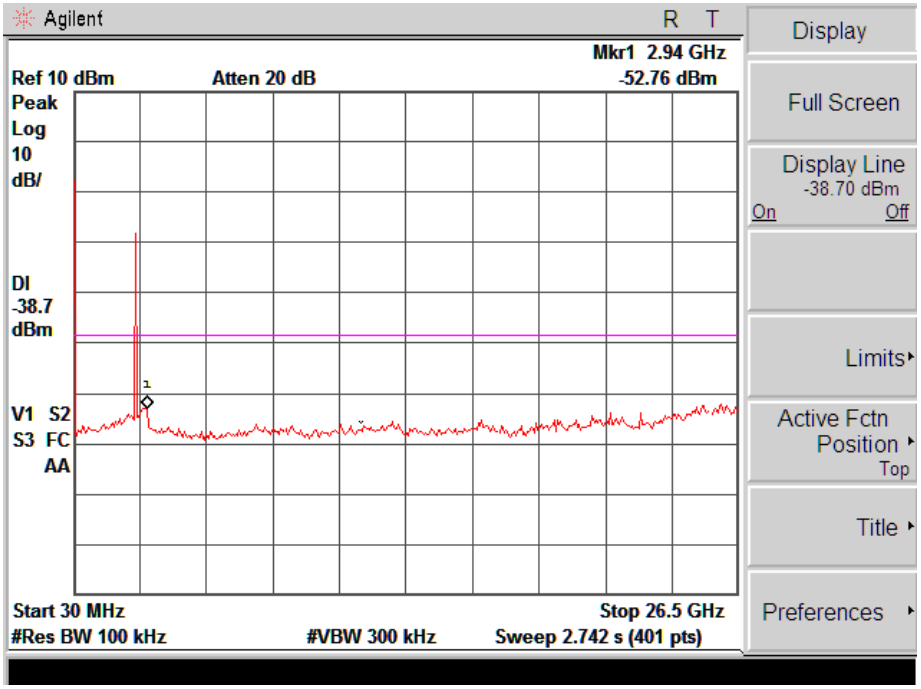


Middle Channel

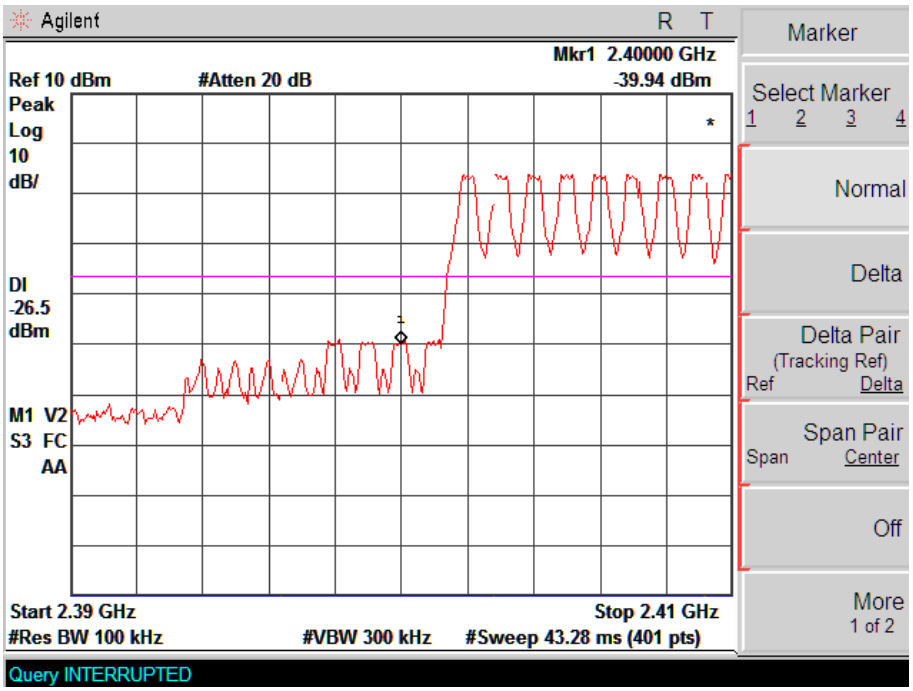


Highest

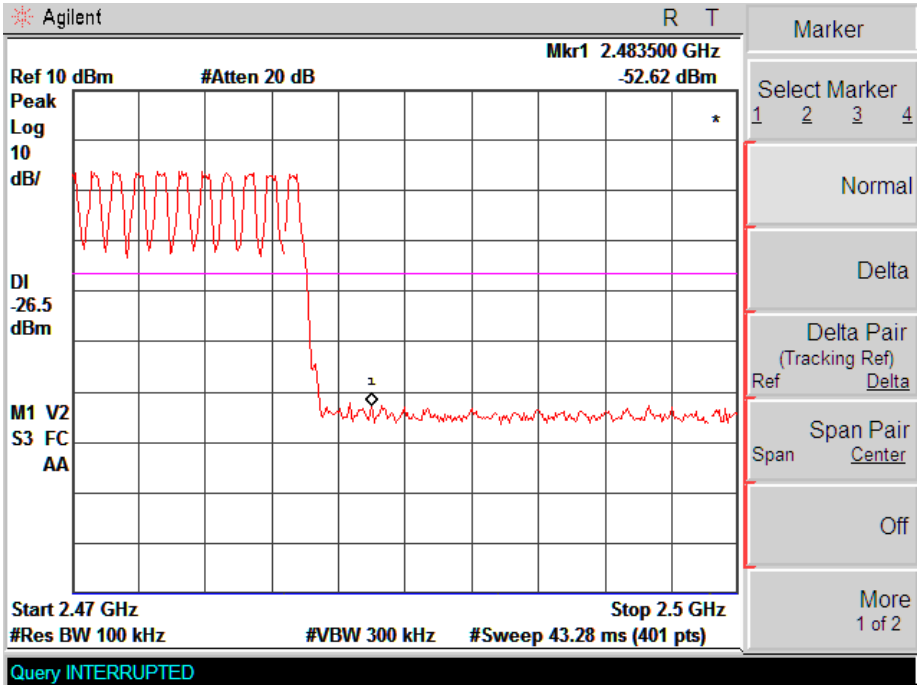

Agilent
R T
Mkr1 2.483500 GHz
Ref 10 dBm
Atten 20 dB
-59 dBm
Peak
Log
10
dB/
DI
-26.9
dBm
M1 S2
S3 FC
AA
Start 2.478 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.5 GHz
Sweep 4 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2


Agilent
R T
Mkr1 2.94 GHz
Ref 10 dBm
Atten 20 dB
-52.76 dBm
Peak
Log
10
dB/
DI
-38.7
dBm
V1 S2
S3 FC
AA
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.5 GHz
Sweep 2.742 s (401 pts)
Display
Full Screen
Display Line
-38.70 dBm
On Off
Limits
Active Fctn
Position
Top
Title
Preferences

Band edge with Hopping on:
Lowest Band edge (Worst case: GFSK)



Highest Band edge

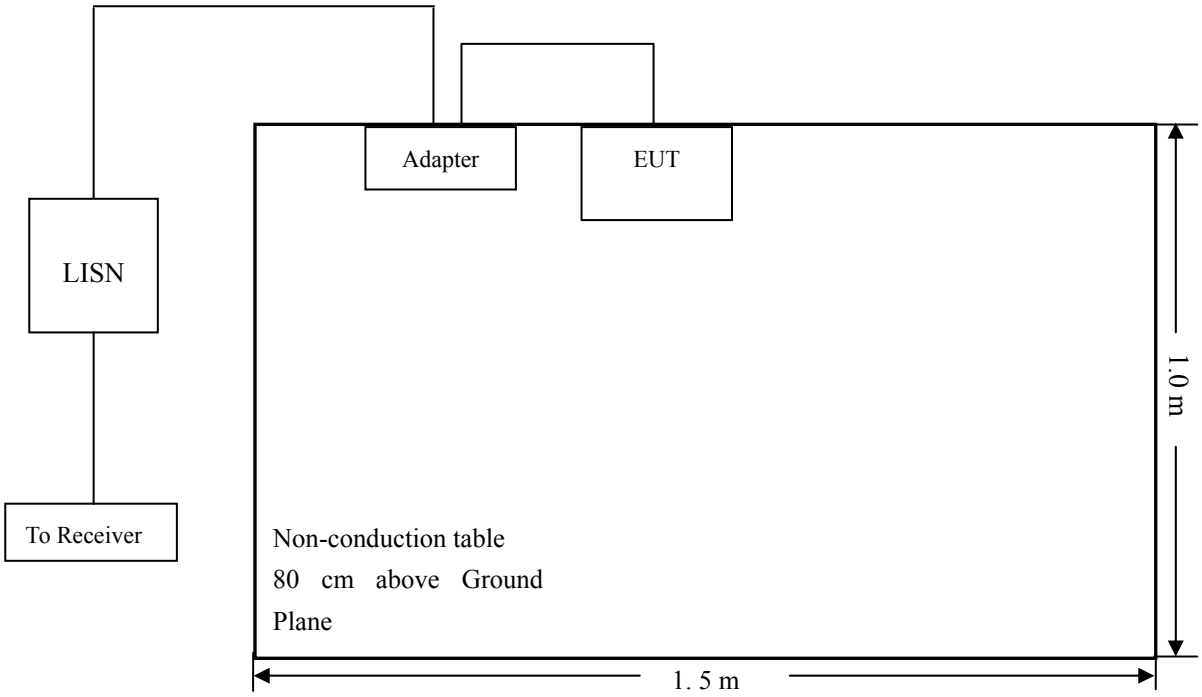


12. Conducted Emissions

12.1 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 Limit.
The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.
The spacing between the peripherals was 10 cm.

12.2 Basic Test Setup Block Diagram



12.3 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

12.4 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency ..... 150 kHz
Stop Frequency..... 30 MHz
Sweep Speed ..... Auto
IF Bandwidth..... 10 kHz
Quasi-Peak Adapter Bandwidth ..... 9 kHz
Quasi-Peak Adapter Mode ..... Normal

12.5 Summary of Test Results/Plots

We test all the modes, and the mode of charging & BT Transmitting has the *worst* margin.

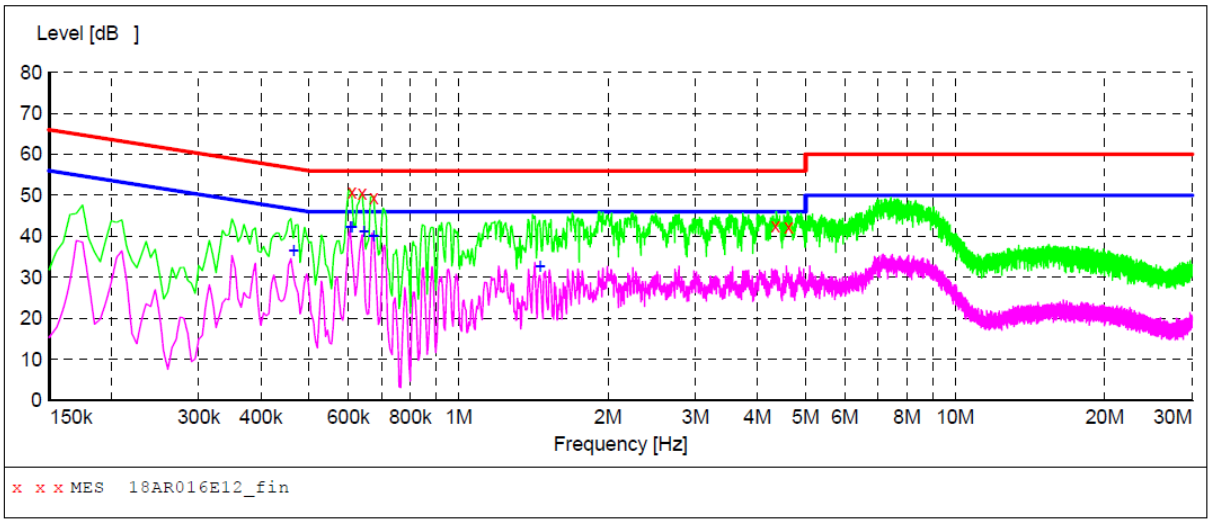
12.6 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

EUT: *CH BLUETOOTH SOUNDBAR SPEAKER*
Tested Model: *SBB-61250*
Operating Condition: *Charging & BT Transmitting GFSK*
Comment: *DC 5.8V(with a adapter input AC 120V/60Hz)*

Test Specification: *Neutral*

SCAN TABLE: "Voltage(150K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "18AR016E12_fin"

2/16/2018 11:27AM

Frequency MHz	Level dB	Transd dB	Limit dB	Margin dB	Detector	Line	PE
0.610000	50.90	10.4	56	5.1	QP	N	GND
0.640000	50.60	10.4	56	5.4	QP	N	GND
0.675000	49.30	10.3	56	6.7	QP	N	GND
4.350000	42.50	13.3	56	13.5	QP	N	GND
4.620000	42.30	13.4	56	13.7	QP	N	GND

MEASUREMENT RESULT: "18AR016E12_fin2"

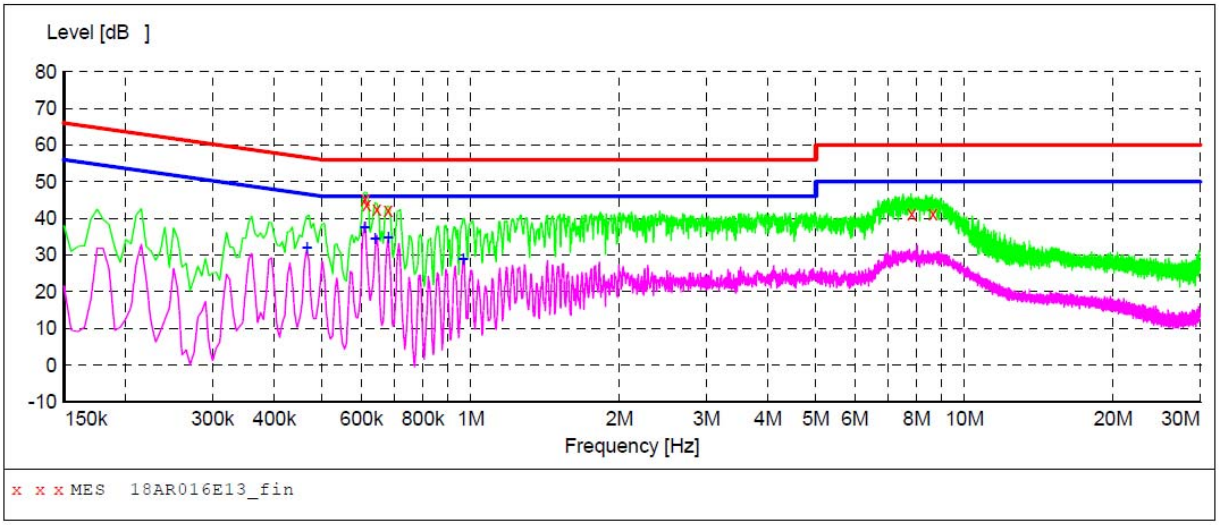
2/16/2018 11:27AM

Frequency MHz	Level dB	Transd dB	Limit dB	Margin dB	Detector	Line	PE
0.465000	36.60	10.8	47	10.0	AV	N	GND
0.605000	42.30	10.4	46	3.7	AV	N	GND
0.610000	42.20	10.4	46	3.8	AV	N	GND
0.645000	41.10	10.4	46	4.9	AV	N	GND
0.675000	40.00	10.3	46	6.0	AV	N	GND
1.460000	32.60	12.0	46	13.4	AV	N	GND

Test Specification: *Line*

SCAN TABLE: "Voltage(150K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "18AR016E13_fin"

2/16/2018 11:44AM

Frequency MHz	Level dB	Transd dB	Limit dB	Margin dB	Detector	Line	PE
0.610000	45.40	10.4	56	10.6	QP	L1	GND
0.615000	43.60	10.4	56	12.4	QP	L1	GND
0.645000	42.40	10.4	56	13.6	QP	L1	GND
0.680000	42.10	10.3	56	13.9	QP	L1	GND
7.815000	41.40	13.6	60	18.6	QP	L1	GND
8.635000	41.40	13.6	60	18.6	QP	L1	GND

MEASUREMENT RESULT: "18AR-0160E13_fin2"

2/16/2018 11:44AM

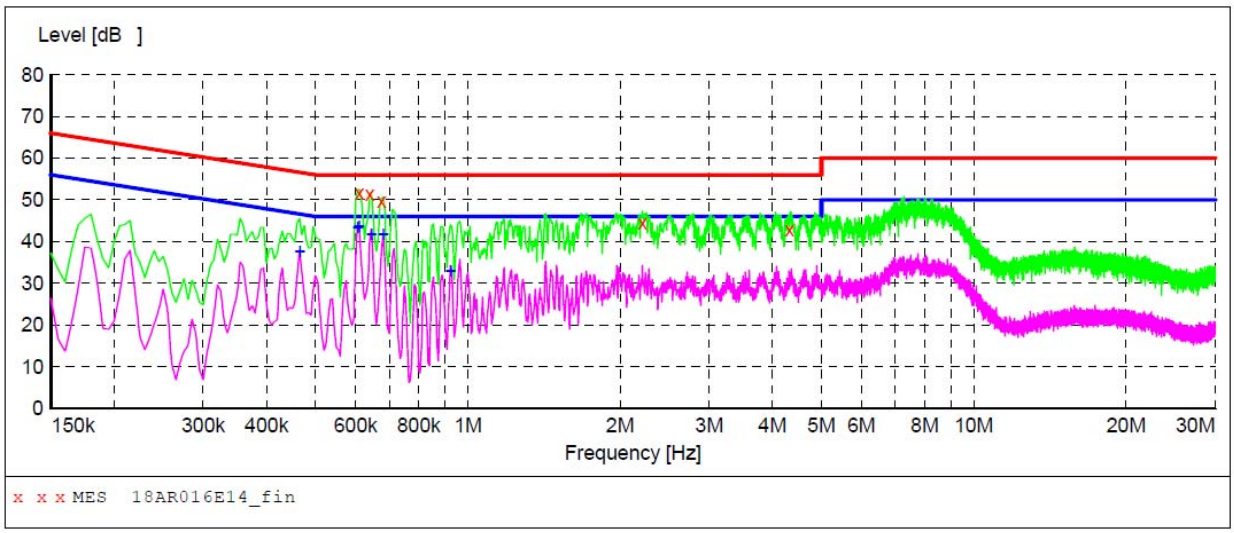
Frequency MHz	Level dB	Transd dB	Limit dB	Margin dB	Detector	Line	PE
0.465000	32.10	10.8	47	14.5	AV	L1	GND
0.610000	37.40	10.4	46	8.6	AV	L1	GND
0.640000	34.50	10.4	46	11.5	AV	L1	GND
0.680000	34.80	10.3	46	11.2	AV	L1	GND
0.965000	28.80	10.4	46	17.2	AV	L1	GND

Plot of Conducted Emissions Test Data

EUT: *CH BLUETOOTH SOUNDBAR SPEAKER*
Tested Model: *SBB-61250*
Operating Condition: *Charging & BT Transmitting pi/4 DQPSK*
Comment: *DC 5.8V(with a adapter input AC 120V/60Hz)*

Test Specification: *Neutral*

SCAN TABLE: "Voltage(150K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "18AR016E14_fin"

2/16/2018 11:29AM

Frequency MHz	Level dB	Transd dB	Limit dB	Margin dB	Detector	Line	PE
0.610000	51.70	10.4	56	4.3	QP	N	GND
0.640000	51.30	10.4	56	4.7	QP	N	GND
0.675000	49.70	10.3	56	6.3	QP	N	GND
2.215000	44.40	13.0	56	11.6	QP	N	GND
4.320000	42.90	13.3	56	13.1	QP	N	GND

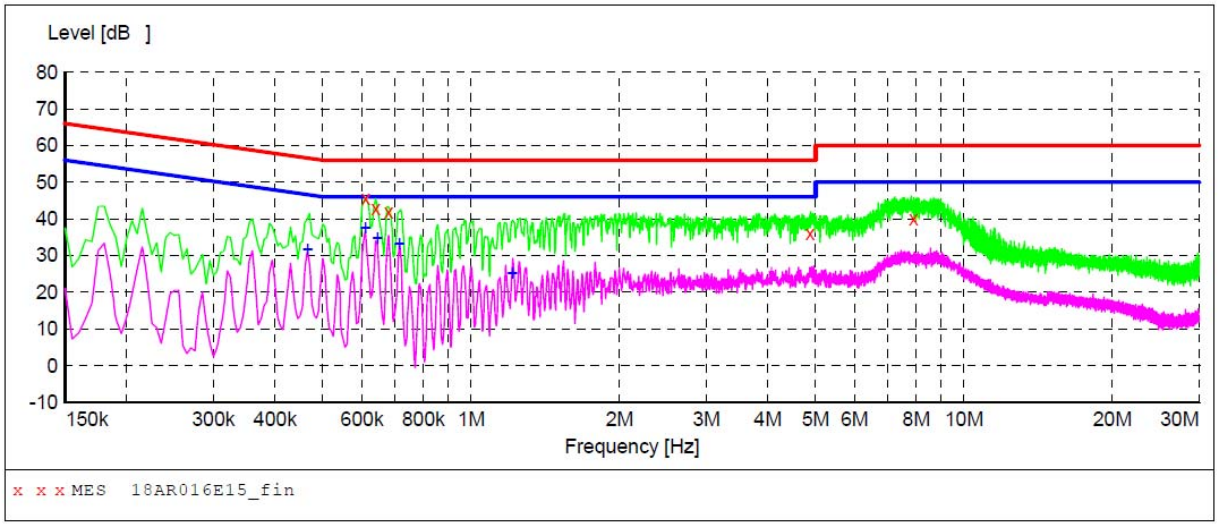
MEASUREMENT RESULT: "18AR016E14_fin2"

2/16/2018 11:29AM

Frequency MHz	Level dB	Transd dB	Limit dB	Margin dB	Detector	Line	PE
0.465000	37.70	10.8	47	8.9	AV	N	GND
0.605000	43.30	10.4	46	2.7	AV	N	GND
0.610000	43.70	10.4	46	2.3	AV	N	GND
0.645000	41.70	10.4	46	4.3	AV	N	GND
0.680000	41.80	10.3	46	4.2	AV	N	GND
0.925000	33.00	10.3	46	13.0	AV	N	GND

Test Specification: *Line*

SCAN TABLE: "Voltage(150K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "18AR016E15_fin"

2/16/2018 11:41AM

Frequency MHz	Level dB	Transd dB	Limit dB	Margin dB	Detector	Line	PE
0.610000	45.50	10.4	56	10.5	QP	L1	GND
0.640000	42.90	10.4	56	13.1	QP	L1	GND
0.680000	42.00	10.3	56	14.0	QP	L1	GND
4.870000	36.00	13.4	56	20.0	QP	L1	GND
7.900000	40.10	13.6	60	19.9	QP	L1	GND

MEASUREMENT RESULT: "18AR016E15_fin2"

2/16/2018 11:41AM

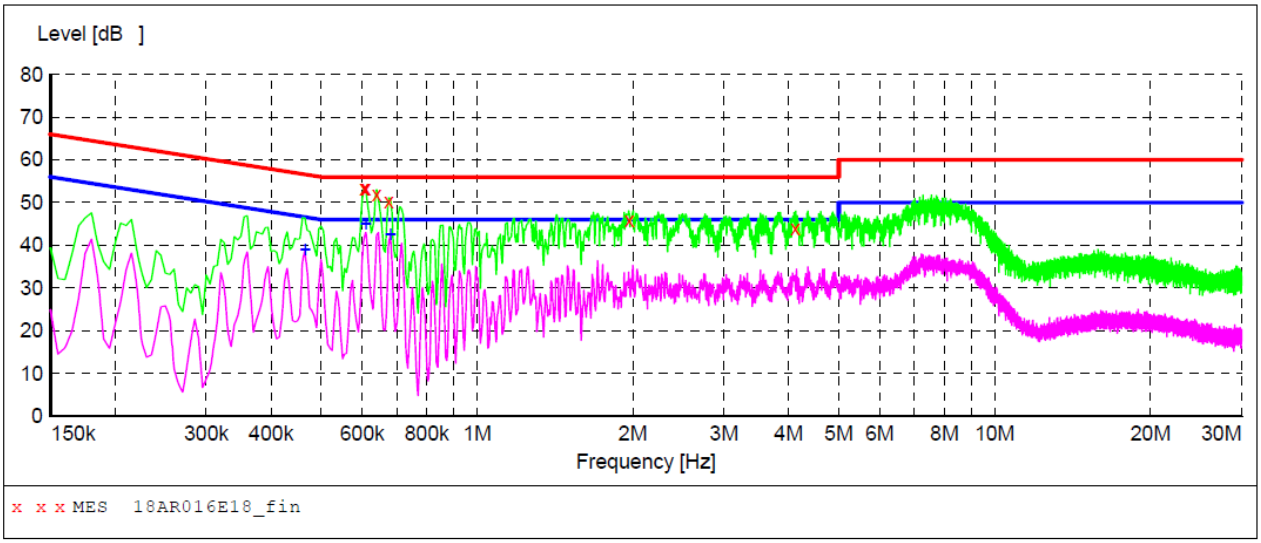
Frequency MHz	Level dB	Transd dB	Limit dB	Margin dB	Detector	Line	PE
0.465000	31.70	10.8	47	14.9	AV	L1	GND
0.610000	37.50	10.4	46	8.5	AV	L1	GND
0.645000	34.80	10.4	46	11.2	AV	L1	GND
0.715000	33.20	10.3	46	12.8	AV	L1	GND
1.210000	25.30	11.2	46	20.7	AV	L1	GND

Plot of Conducted Emissions Test Data

EUT: *CH BLUETOOTH SOUNDBAR SPEAKER*
Tested Model: *SBB-61250*
Operating Condition: *Charging & BT Transmitting 8DPSK*
Comment: *DC 5.8V(with a adapter input AC 120V/60Hz)*

Test Specification: *Neutral*

SCAN TABLE: "Voltage(150K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "18AR016E18_fin"

2/16/2018 11:35AM

Frequency MHz	Level dB	Transd dB	Limit dB	Margin dB	Detector	Line	PE
0.605000	53.20	10.4	56	2.8	QP	N	GND
0.610000	53.20	10.4	56	2.8	QP	N	GND
0.640000	51.90	10.4	56	4.1	QP	N	GND
0.675000	50.30	10.3	56	5.7	QP	N	GND
1.965000	45.90	13.2	56	10.1	QP	N	GND
4.115000	44.00	13.3	56	12.0	QP	N	GND

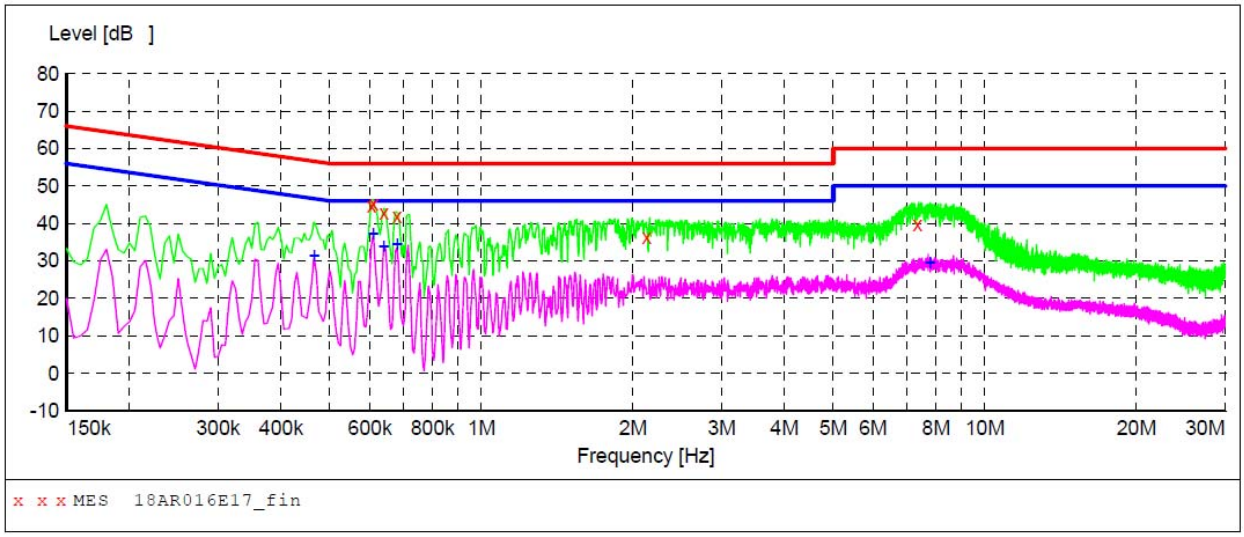
MEASUREMENT RESULT: "18AR016E18_fin2"

2/16/2018 11:35AM

Frequency MHz	Level dB	Transd dB	Limit dB	Margin dB	Detector	Line	PE
0.465000	39.10	10.8	47	7.5	AV	N	GND
0.610000	44.90	10.4	46	1.1	AV	N	GND
0.680000	42.60	10.3	46	3.4	AV	N	GND

Test Specification: *Line*

SCAN TABLE: "Voltage(150K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT: "18AR016E17_fin"

2/16/2018 11:39AM

Frequency MHz	Level dB	Transd dB	Limit dB	Margin dB	Detector	Line	PE
0.605000	44.60	10.4	56	11.4	QP	L1	GND
0.610000	45.20	10.4	56	10.8	QP	L1	GND
0.640000	42.90	10.4	56	13.1	QP	L1	GND
0.680000	41.90	10.3	56	14.1	QP	L1	GND
2.130000	36.20	13.1	56	19.8	QP	L1	GND
7.350000	39.70	13.5	60	20.3	QP	L1	GND

MEASUREMENT RESULT: "18AR016E17_fin2"

2/16/2018 11:39AM

Frequency MHz	Level dB	Transd dB	Limit dB	Margin dB	Detector	Line	PE
0.465000	31.40	10.8	47	15.2	AV	L1	GND
0.610000	37.10	10.4	46	8.9	AV	L1	GND
0.640000	33.80	10.4	46	12.2	AV	L1	GND
0.680000	34.60	10.3	46	11.4	AV	L1	GND
7.775000	29.40	13.6	50	20.6	AV	L1	GND

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