

EMC

TEST REPORT

Report No. : 180400031TWN-001
Model No. : HURESAC-3XE-C
Issued Date: Apr. 11, 2018

Applicant: Johnson Health Tech. Co., Ltd.
No. 999, Sec. 2, Dongda Rd., Daya Dist., Taichung City 428,
Taiwan

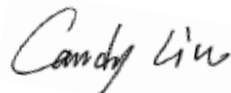
Test Method/ Standard: 47 CFR FCC Part 15.249 & ANSI C63.10:2013

Test By: Intertek Testing Services Taiwan Ltd.
Hsinchu Laboratory
No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li,
Shiang-Shan District, Hsinchu City, Taiwan

Registration Number: 960839

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The test report was prepared by:



Candy Liu / Assistant

These measurements were taken by:



Wayne Chen / Engineer

The test report was reviewed by:


Name Rico Deng
Title Supervisor

Revision History

Report No.	Issue Date	Revision Summary
180400031TWN-001	Apr. 11, 2018	Add NFC module only. After engineer judgment, the difference does not affect original the RF characteristic, PCB layout and antenna location. Then the all test data and test items in this report based on report of 160300215TWN-001.

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Summary of Tests

Test	Reference	Results
Radiated Emission test	15.249(c), 15.209	Pass
Emission on the Band Edge	15.249(d)	Pass
Conducted Emission of AC Power	15.207	Pass
20dB Bandwidth	15.215(c)	Pass

1. General information

1.1 Identification of the EUT

Product:	Console for Exercise Machine
Model No.:	HURESAC-3XE-C
Radio Module:	MS-57423
Brand Name:	Matrix Fitness
Frequency Range:	2402MHz~2480MHz
Total Hopping Channel No:	79 channels
Frequency of Each Channel:	2402+1k MHz, k=0~78
Type of Modulation:	GFSK, $\pi/4$ DQSP, 8DPSK
Rated Power:	DC 12 from adapter
Power Cord:	N/A
Data Cable:	N/A
Sample Received:	Mar. 09, 2016
Test Date(s):	Apr. 23, 2016 ~ Apr. 29, 2016

Note 1: The test report only allows to be revised within three years from its original issued date unless further standard or the requirement was noticed.

Note 2: When determining the test conclusion, the Measurement Uncertainty of test has been considered.

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1.2 Additional information about the EUT

Modulation mode	Transmit path
	Chain 0 / Main
GFSK	V
$\pi/4$ DQPSK	V
8DPSK	V

Product SW version : UI 0.1.7.2, OS 2.0.19, IO 10
Product HW version : v1.1
Radio SW version : N/A
Radio HW version : 0B
Test SW Version : USI_BCM43XX_Testing_Tool_V1_4_10r8

1.3 Antenna description

The antenna is affixed to the EUT using a unique connector, which allows for replacement of a broken antenna, but DOES NOT use a standard antenna jack or electrical connector..

Antenna Gain : 2.8 dBi
Antenna Type : PIFA Antenna
Connector Type : I-PEX

1.4 Peripherals equipment

Peripherals	Brand	Model No.	Serial No.	Data cable
Notebook PC	DELL	Latitude D610	1YWZK1S	Micro USB cable 1 meter × 1
Adapter	N/A	LSE0107A1240	N/A	N/A

2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart C Paragraph 15.249 for non-spread spectrum devices.

The test of radiated measurements according to FCC Part15 Section 15.33(a) had been conducted and the field strength of this frequency band was all meet limit requirement, thus we evaluate the EUT pass the specified test.

2.2 Operation mode

The EUT was supplied with DC 12V from adapter
TX-MODE is based on a specific test program “USI BCM FCC CE REG Tool”, and the program can select different frequency and modulation.

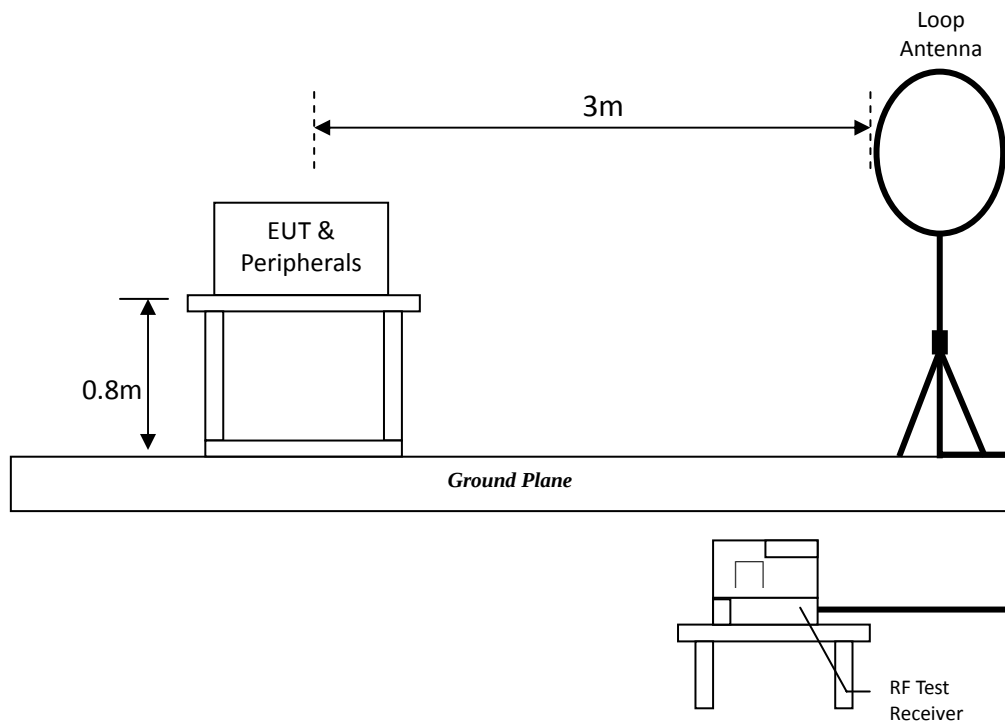
3. Radiated emission test FCC 15.249 (C)

3.1 Operating environment

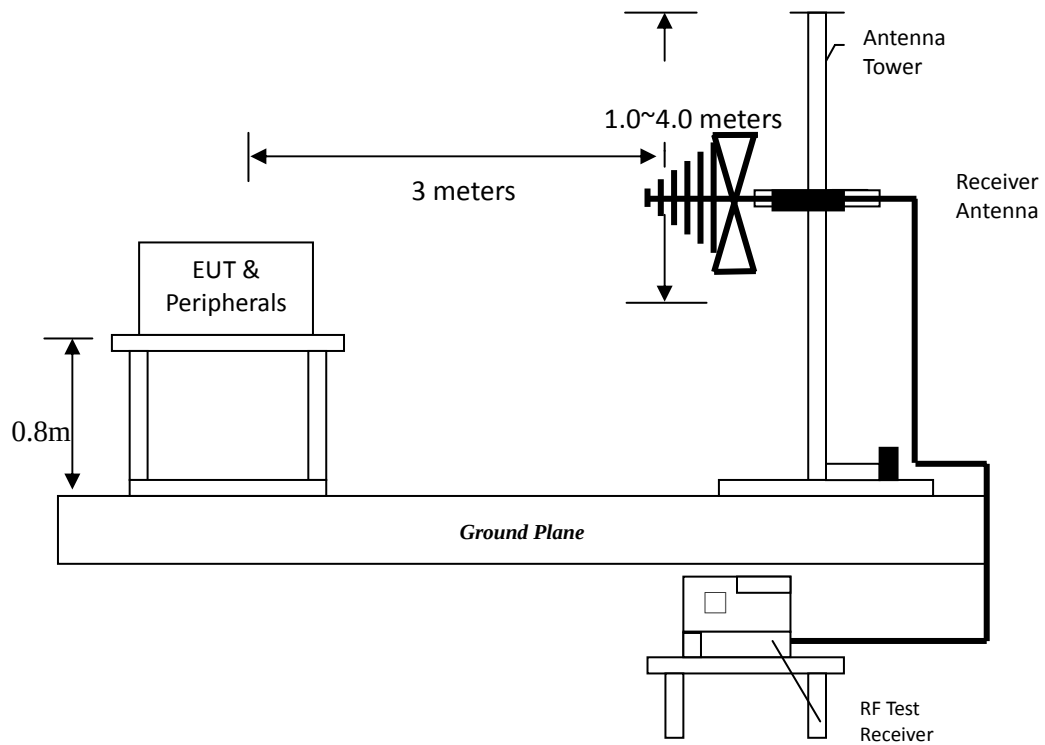
Temperature:	25	°C
Relative Humidity:	55	%
Atmospheric Pressure	1008	hPa

3.2 Test setup & procedure

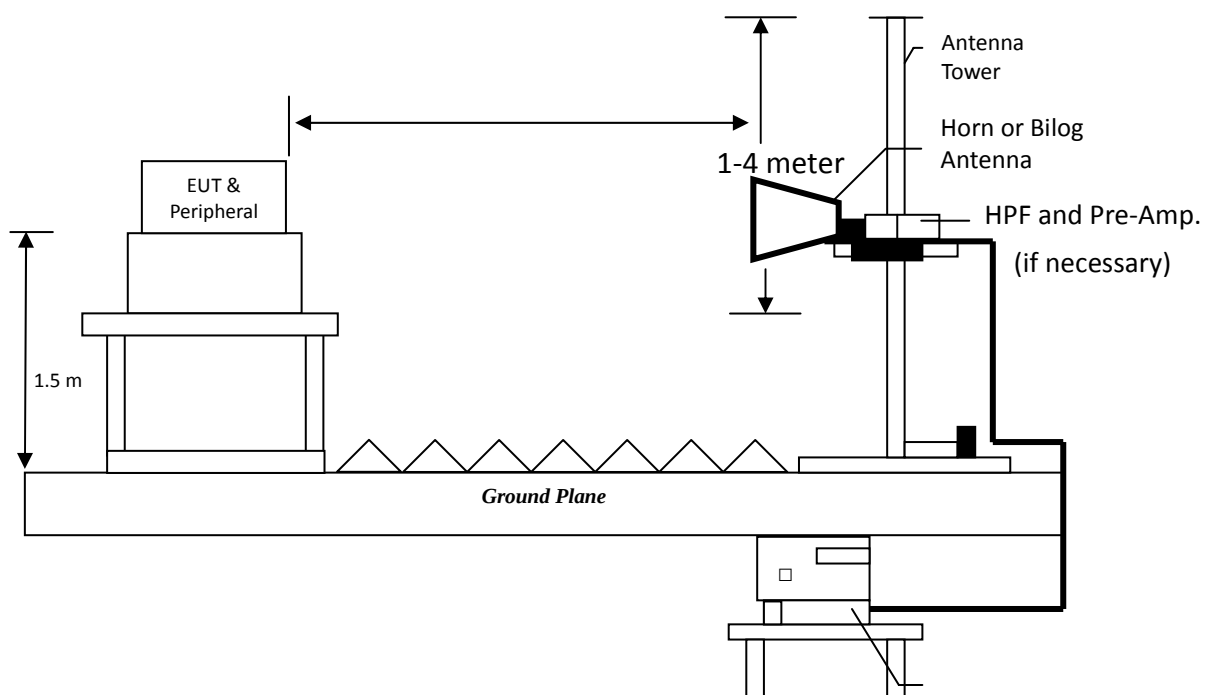
Radiated emission from 9 kHz to 30 MHz uses Loop Antenna:



Radiated emission from 30 MHz to 1 GHz uses Bilog Antenna:



Radiated emission above 1 GHz uses Horn Antenna:



Radiated emissions were investigated cover the frequency range from 30MHz to 1000MHz using a receiver RBW of 120kHz record QP reading, and the frequency over 1GHz using a spectrum analyzer RBW of 1MHz and 10Hz VBW record Average reading. (15.209 paragraph), the Peak reading (1 MHz RBW/ 3 MHz VBW) recorded also on the report. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.

The EUT for testing is arranged on a turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.

The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

The EUT configurations please refer to the "Spurious set-up photo.pdf".

3.3 Emission limit

3.3.1 Fundamental and harmonics emission limits

Frequency (MHz)	Field Strength of Fundamental		Field Strength of Harmonics	
	(mV/m@3m)	(dBuV/m@3m)	(uV/m@3m)	(dBuV/m@3m)
2400-2483.5	50	94	500	54

3.3.2 General radiated emission limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

Frequency MHz	15.209 Limits (dBμV/m@3m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

3.4 Radiated spurious emission test data

3.4.1 Measurement results: frequencies 9kHz ~ 30MHz

The test was performed on EUT continuously transmitting mode.

EUT : HURESAC-3XE-C

Frequency (MHz)	Detection value	factor (dB/m)	Reading (dBμV)	value (dBμV/m)	Limit @ 3m (dBμV/m)	Tolerance (dB)
0.02	QP	20.92	15.76	36.68	200.00	-163.33
0.03	QP	20.86	19.27	40.13	160.00	-119.87
0.05	QP	20.83	16.10	36.93	128.00	-91.07
0.07	QP	20.81	15.34	36.15	114.29	-78.14
0.11	QP	20.77	15.72	36.49	101.82	-65.33

Remark: Corr. Factor = Antenna Factor + Cable Loss

3.4.2 Measurement results: frequencies equal to or less than 1 GHz

The test was performed on EUT under GFSK, $\pi/4$ DQSP, & 8-DPSK continuously transmitting mode. Channel 0, 39, 78 were verified. The worst case occurred at 8-DPSK TX Channel 39

EUT : HURESAC-3XE-C
Test Condition : 8-DPSK TX Channel 39

Antenna Polariz. (V/H)	Freq. (MHz)	Receiver Detector	Corr. Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
Vertical	47.46	QP	9.04	31.30	31.12	40.00	-8.88
Vertical	95.96	QP	14.55	24.22	29.89	43.50	-13.61
Vertical	191.02	QP	13.97	26.07	34.77	43.50	-8.73
Vertical	288.02	QP	14.72	26.39	34.11	46.00	-11.89
Vertical	336.52	QP	15.68	24.37	31.35	46.00	-14.65
Vertical	528.58	QP	20.36	20.72	37.97	46.00	-8.03
Horizontal	95.96	QP	12.20	31.21	25.43	43.50	-18.07
Horizontal	191.02	QP	14.07	28.97	34.36	43.50	-9.14
Horizontal	216.24	QP	14.72	30.34	32.75	46.00	-13.25
Horizontal	239.52	QP	15.68	27.57	33.20	46.00	-12.80
Horizontal	288.02	QP	17.02	26.27	39.59	46.00	-6.41
Horizontal	336.52	QP	18.35	27.31	37.42	46.00	-8.58

Remark:

1. Corr. Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Corr. Factor

3.4.3 Measurement results: frequency above 1GHz

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
GFSK Ch_Low	3150	PK	V	39.85	-3.73	48.11	44.38	74.00	-29.62
	4804	PK	V	40.13	-0.10	42.14	42.04	74.00	-31.96
	3150	PK	H	39.85	-3.73	46.73	43.00	74.00	-31.00
	4804	PK	H	40.13	-0.10	42.98	42.88	74.00	-31.12
GFSK Ch_Middle	3150	PK	V	39.85	-3.73	48.75	45.02	74.00	-28.98
	4882	PK	V	39.99	0.16	42.51	42.67	74.00	-31.33
	3150	PK	H	39.85	-3.73	46.09	42.36	74.00	-31.64
	4882	PK	H	39.99	0.16	41.19	41.35	74.00	-32.65
GFSK Ch_High	3150	PK	V	39.85	-3.73	47.43	43.70	74.00	-30.30
	4960	PK	V	39.84	0.41	42.84	43.25	74.00	-30.75
	3150	PK	H	39.85	-3.73	46.18	42.45	74.00	-31.55
	4960	PK	H	39.84	0.41	45.00	45.41	74.00	-28.59

Remark:

1. Correction Factor = Antenna Factor + Cable Loss + Power Amplifier
2. Corrected Level = Reading + Correction Factor
3. The frequency measured ranges from 1 GHz to 25 GHz. The data value listed above which is higher than the system noise floor.

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
π/4-DQPSK Ch_Low	3150	PK	V	39.85	-3.73	47.55	43.82	74.00	-30.18
	4804	PK	V	40.13	-0.10	41.64	41.54	74.00	-32.46
	3150	PK	H	39.85	-3.73	45.83	42.10	74.00	-31.90
	4804	PK	H	40.13	-0.10	41.40	41.30	74.00	-32.70
π/4-DQPSK Ch_Middle	3150	PK	V	39.85	-3.73	47.77	44.04	74.00	-29.96
	4882	PK	V	39.99	0.16	41.09	41.25	74.00	-32.75
	3150	PK	H	39.85	-3.73	46.62	42.89	74.00	-31.11
	4882	PK	H	39.99	0.16	41.08	41.24	74.00	-32.76
π/4-DQPSK Ch_High	3150	PK	V	39.85	-3.73	48.21	44.48	74.00	-29.52
	4960	PK	V	39.84	0.41	41.11	41.52	74.00	-32.48
	3150	PK	H	39.85	-3.73	46.56	42.83	74.00	-31.17
	4960	PK	H	39.84	0.41	42.13	42.54	74.00	-31.46

Remark:

1. Correction Factor = Antenna Factor + Cable Loss + Power Amplifier
2. Corrected Level = Reading + Correction Factor
3. The frequency measured ranges from 1 GHz to 25 GHz. The data value listed above which is higher than the system noise floor.

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
8DPSK Ch_Low	3150	PK	V	39.85	-3.73	48.26	44.53	74.00	-29.47
	4804	PK	V	40.13	-0.10	41.06	40.96	74.00	-33.04
	3150	PK	H	39.85	-3.73	47.15	43.42	74.00	-30.58
	4804	PK	H	40.13	-0.10	41.46	41.36	74.00	-32.64
8DPSK Ch_Middle	3150	PK	V	39.85	-3.73	47.14	43.41	74.00	-30.59
	4882	PK	V	39.99	0.16	41.25	41.41	74.00	-32.59
	3150	PK	H	39.85	-3.73	46.10	42.37	74.00	-31.63
	4882	PK	H	39.99	0.16	40.91	41.07	74.00	-32.93
8DPSK Ch_High	3150	PK	V	39.85	-3.73	47.73	44.00	74.00	-30.00
	4960	PK	V	39.84	0.41	41.21	41.62	74.00	-32.38
	3150	PK	H	39.85	-3.73	47.11	43.38	74.00	-30.62
	4960	PK	H	39.84	0.41	41.52	41.93	74.00	-32.07

Remark:

1. Correction Factor = Antenna Factor + Cable Loss + Power Amplifier
2. Corrected Level = Reading + Correction Factor
3. The frequency measured ranges from 1 GHz to 25 GHz. The data value listed above which is higher than the system noise floor.

3.4.5 Measurement results: Fundamental emission

Mode	Channel	Frequency (MHz)	Spectrum Analyzer	Ant. Pol. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
GFSK	Ch0	2402	PK	V	32.59	63.02	95.61	114	-18.39
	Ch0	2402	AV	V	32.59	21.52	54.11	94	-39.89
	Ch0	2402	PK	H	32.59	60.63	93.22	114	-20.78
	Ch0	2402	AV	H	32.59	18.04	50.63	94	-43.37
	Ch39	2441	PK	V	32.63	65.38	98.01	114	-15.99
	Ch39	2441	AV	V	32.63	18.92	51.55	94	-42.45
	Ch39	2441	PK	H	32.63	62.36	94.99	114	-19.01
	Ch39	2441	AV	H	32.63	18.10	50.73	94	-43.27
	Ch78	2480	PK	V	32.64	62.83	95.47	114	-18.53
	Ch78	2480	AV	V	32.64	18.36	51.00	94	-43.00
	Ch78	2480	PK	H	32.64	62.72	95.36	114	-18.64
	Ch78	2480	AV	H	32.64	17.83	50.47	94	-43.53
$\pi/4$ -DPSK	Ch0	2402	PK	V	32.59	63.90	96.49	114	-17.51
	Ch0	2402	AV	V	32.59	19.38	51.97	94	-42.03
	Ch0	2402	PK	H	32.59	61.69	94.28	114	-19.72
	Ch0	2402	AV	H	32.59	17.67	50.26	94	-43.74
	Ch39	2441	PK	V	32.63	65.35	97.98	114	-16.02
	Ch39	2441	AV	V	32.63	18.96	51.59	94	-42.41
	Ch39	2441	PK	H	32.63	62.25	94.88	114	-19.12
	Ch39	2441	AV	H	32.63	17.44	50.07	94	-43.93
	Ch78	2480	PK	V	32.64	62.41	95.05	114	-18.95
	Ch78	2480	AV	V	32.64	20.35	52.99	94	-41.01
	Ch78	2480	PK	H	32.64	62.12	94.76	114	-19.24
	Ch78	2480	AV	H	32.64	18.39	51.03	94	-42.97
8-DPSK	Ch0	2402	PK	V	32.59	63.29	95.88	114	-18.12
	Ch0	2402	AV	V	32.59	21.13	53.72	94	-40.28
	Ch0	2402	PK	H	32.59	60.52	93.11	114	-20.89
	Ch0	2402	AV	H	32.59	19.97	52.56	94	-41.44
	Ch39	2441	PK	V	32.63	65.99	98.62	114	-15.38
	Ch39	2441	AV	V	32.63	18.55	51.18	94	-42.82
	Ch39	2441	PK	H	32.63	62.24	94.87	114	-19.13
	Ch39	2441	AV	H	32.63	17.44	50.07	94	-43.93
	Ch78	2480	PK	V	32.64	62.86	95.50	114	-18.50
	Ch78	2480	AV	V	32.64	20.21	52.85	94	-41.15
	Ch78	2480	PK	H	32.64	62.66	95.30	114	-18.70
	Ch78	2480	AV	H	32.64	19.67	52.31	94	-41.69

Remark:

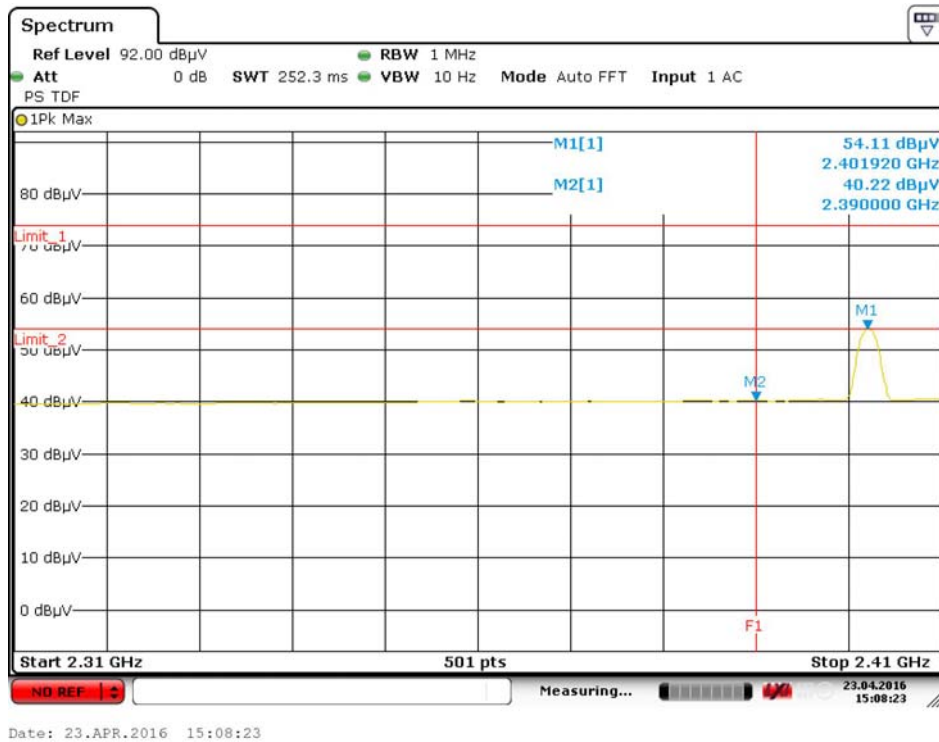
1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor
3. The frequency measured ranges from 1 GHz to 25 GHz. The data value listed above which is higher than the system noise floor.

4. Radiated emission on the band edge FCC 15.249(d)

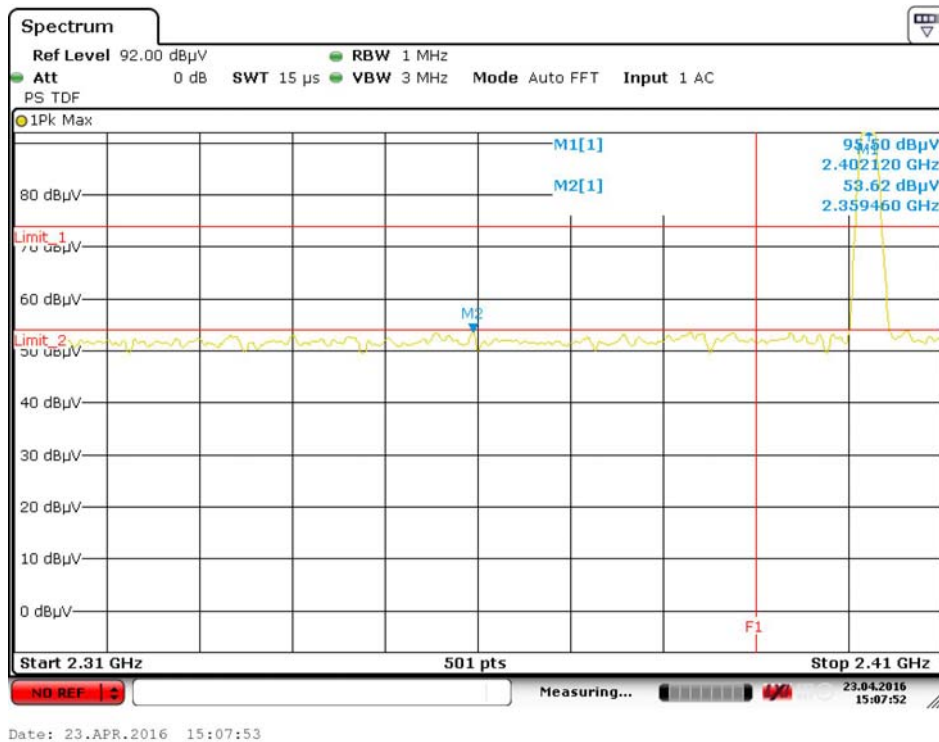
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental (2402~2480MHz) or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)	Restricted band (MHz)
GFSK	2359.46	PK	V	32.40	21.22	53.62	74	-20.38	2310~2390
	2390.00	AV	V	32.51	7.71	40.22	54	-13.78	
	2399.35	PK	V	32.54	21.48	54.02	74	-19.98	2483.5~2500
	2483.50	AV	V	32.84	8.11	40.95	54	-13.05	
π/4-DQPSK	2333.13	PK	V	32.31	21.47	53.78	74	-20.22	2310~2390
	2390.00	AV	V	32.51	7.71	40.22	54	-13.78	
	2489.20	PK	V	32.86	21.40	54.26	74	-19.74	2483.5~2500
	2483.50	AV	V	32.84	8.11	40.95	54	-13.05	
8-DPSK	2388.22	PK	V	32.50	20.03	52.53	74	-21.47	2310~2390
	2390.00	AV	V	32.51	7.75	40.26	54	-13.74	
	2486.15	PK	V	32.85	21.47	54.32	74	-19.68	2483.5~2500
	2483.50	AV	V	32.84	8.07	40.91	54	-13.09	

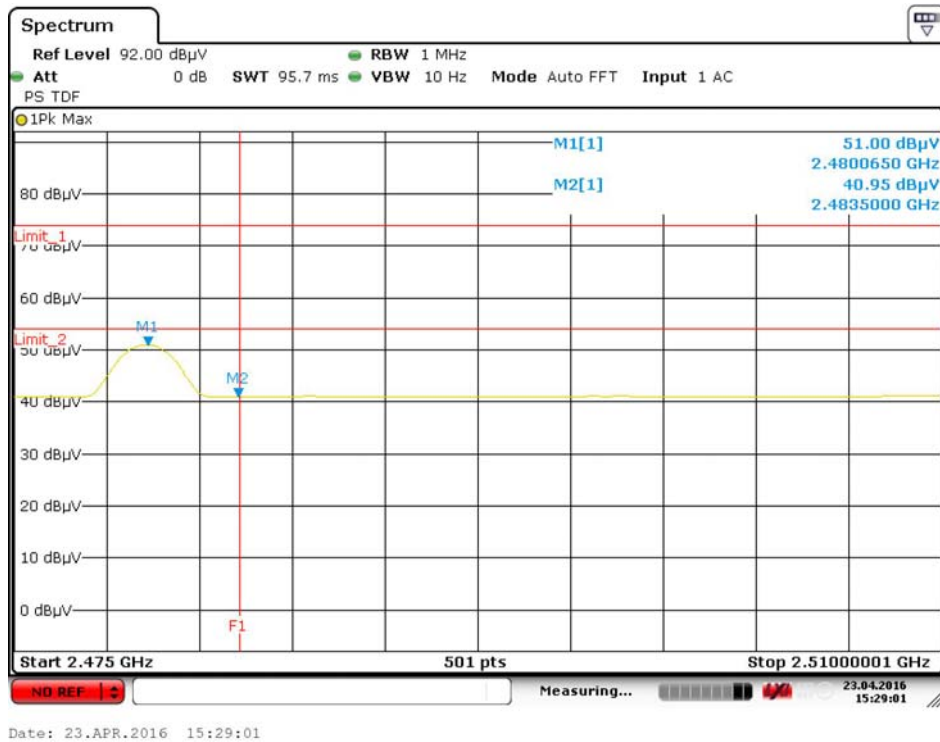
Band edge @ GFSK mode Channel_0 2402MHz Vertical AV



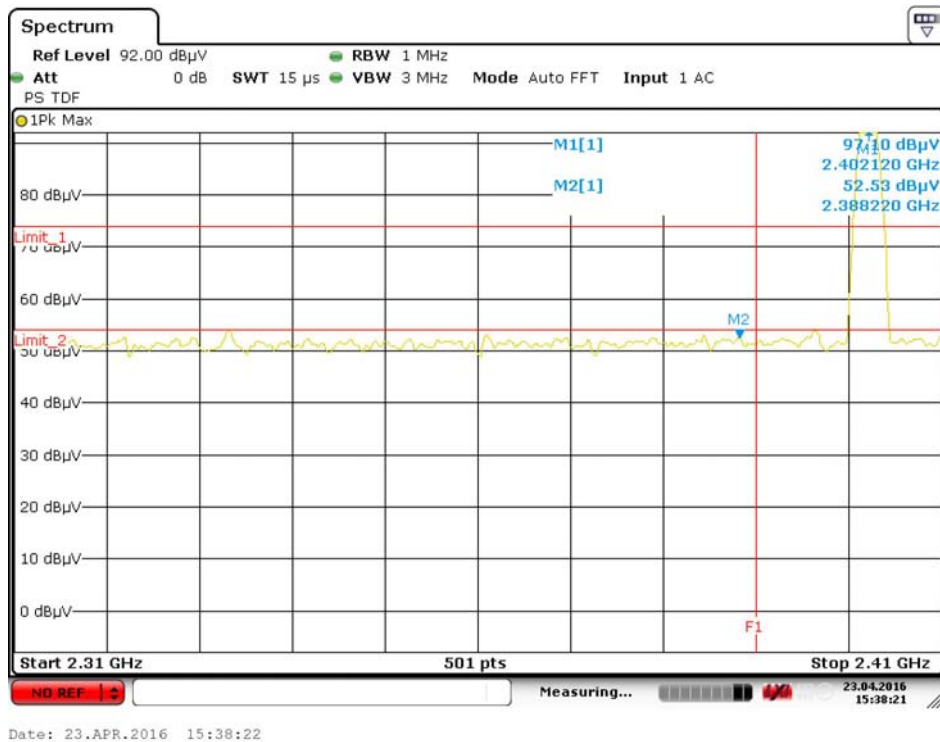
Band edge @ GFSK mode Channel_0 2402MHz Vertical PK



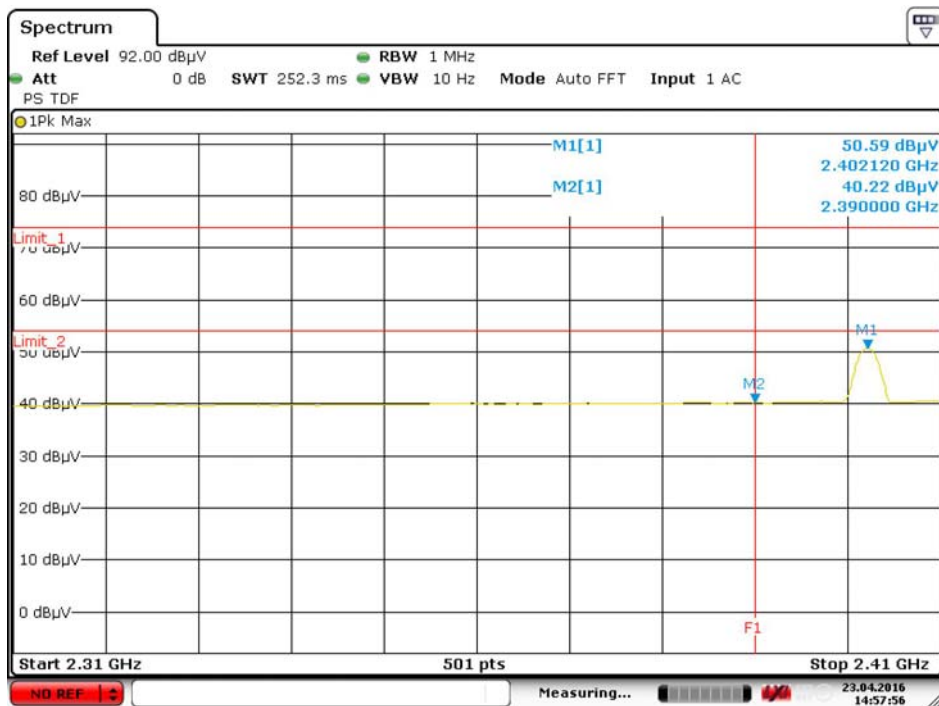
Band edge @ GFSK mode Channel_78 2480MHz Vertical AV



Band edge @ GFSK mode Channel_78 2480MHz Vertical PK

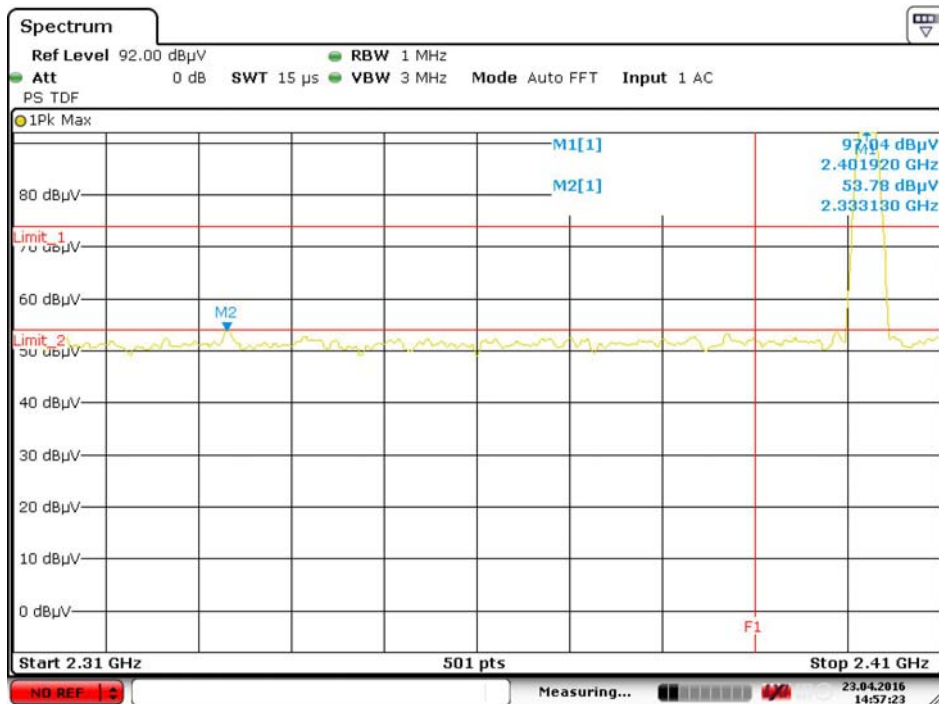


Band edge @ $\pi/4$ -DQPSK mode Channel 0 2402MHz Vertical AV



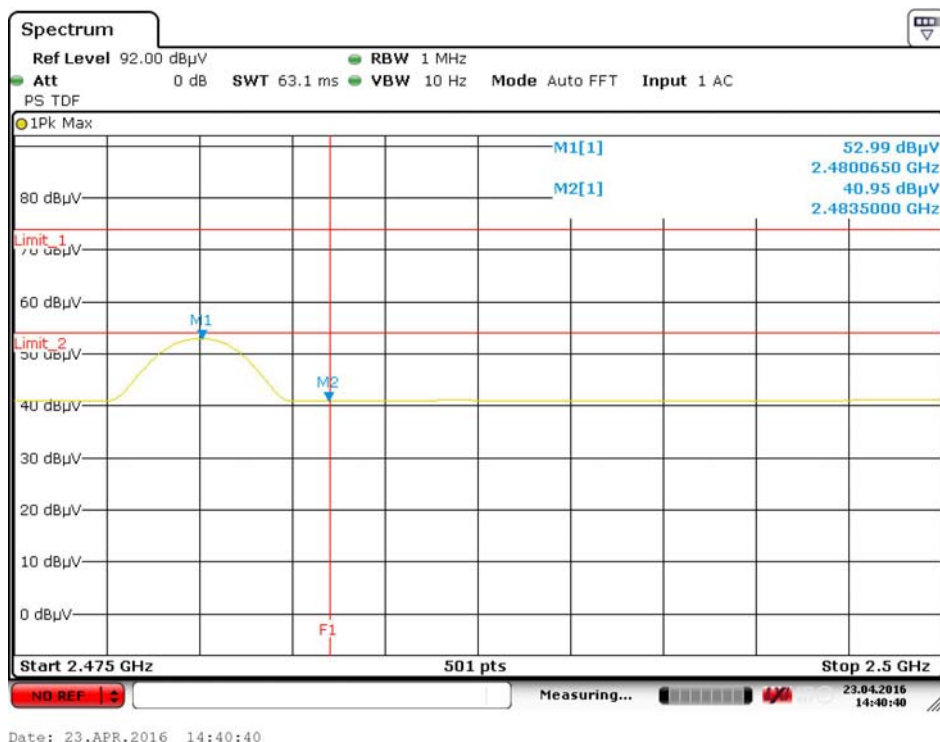
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Band edge @ $\pi/4$ -DQPSK mode Channel 0 2402MHz Vertical PK

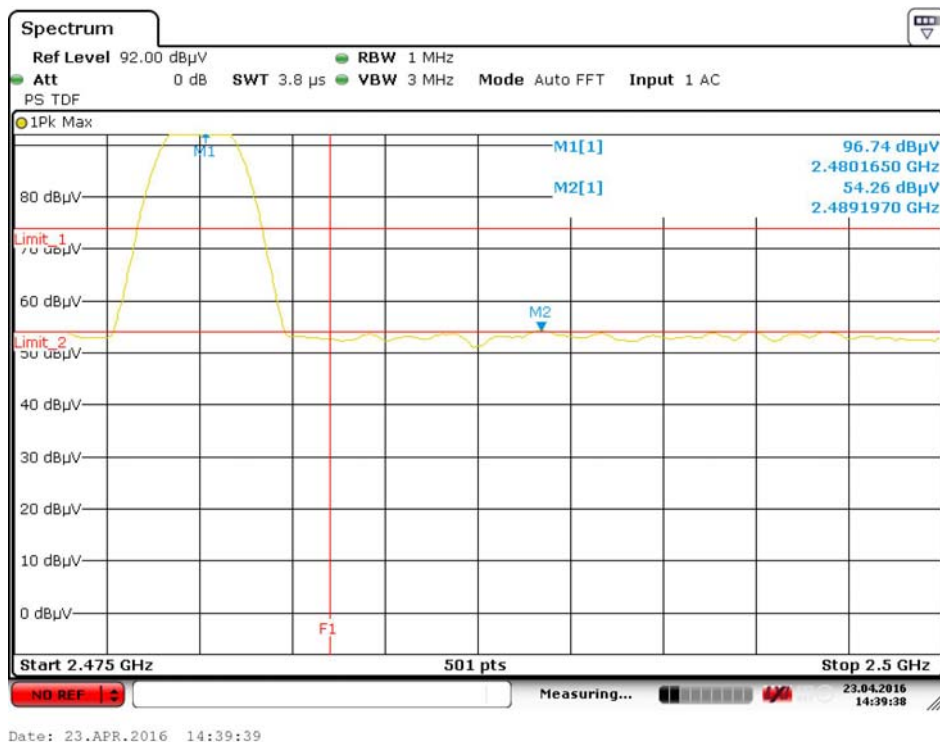


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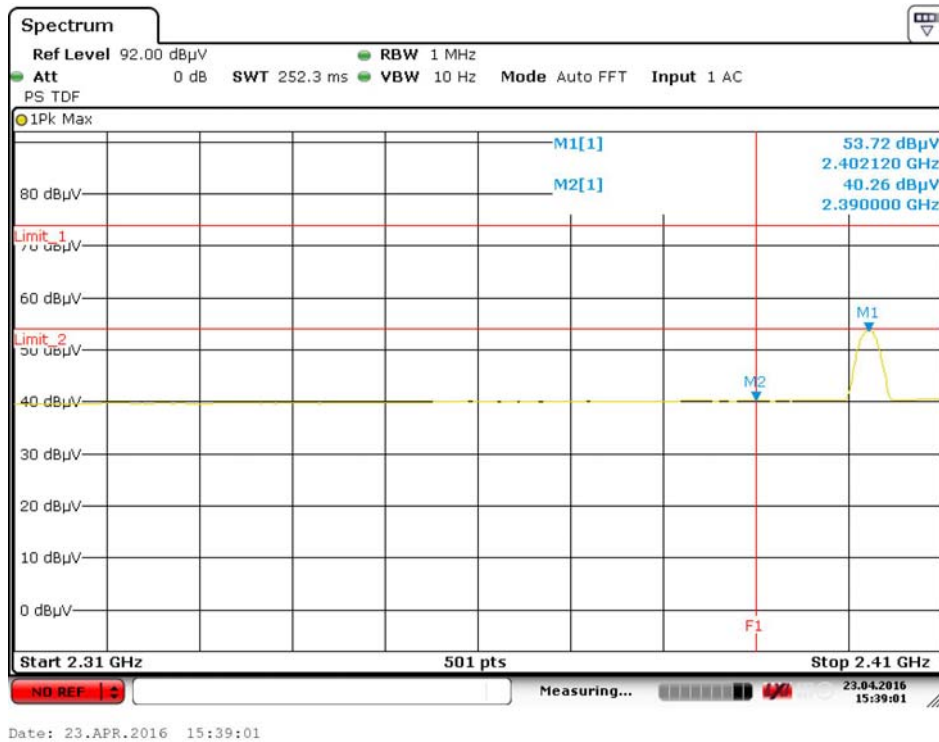
Band edge @ $\pi/4$ -DQPSK mode Channel_78 2480MHz Vertical AV



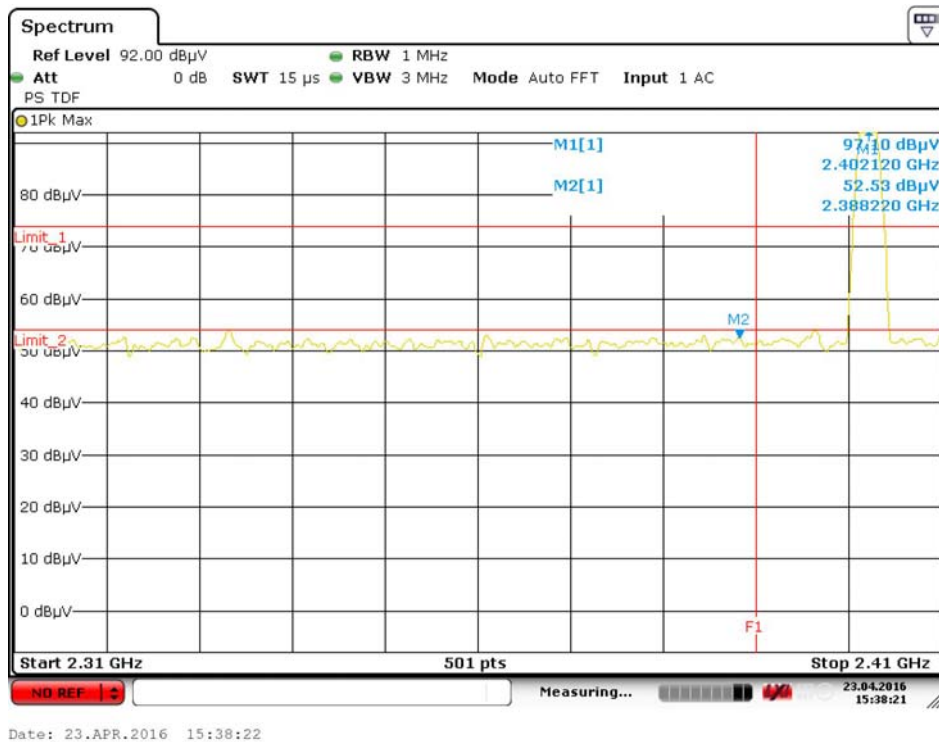
Band edge @ $\pi/4$ -DQPSK mode Channel_78 2480MHz Vertical PK



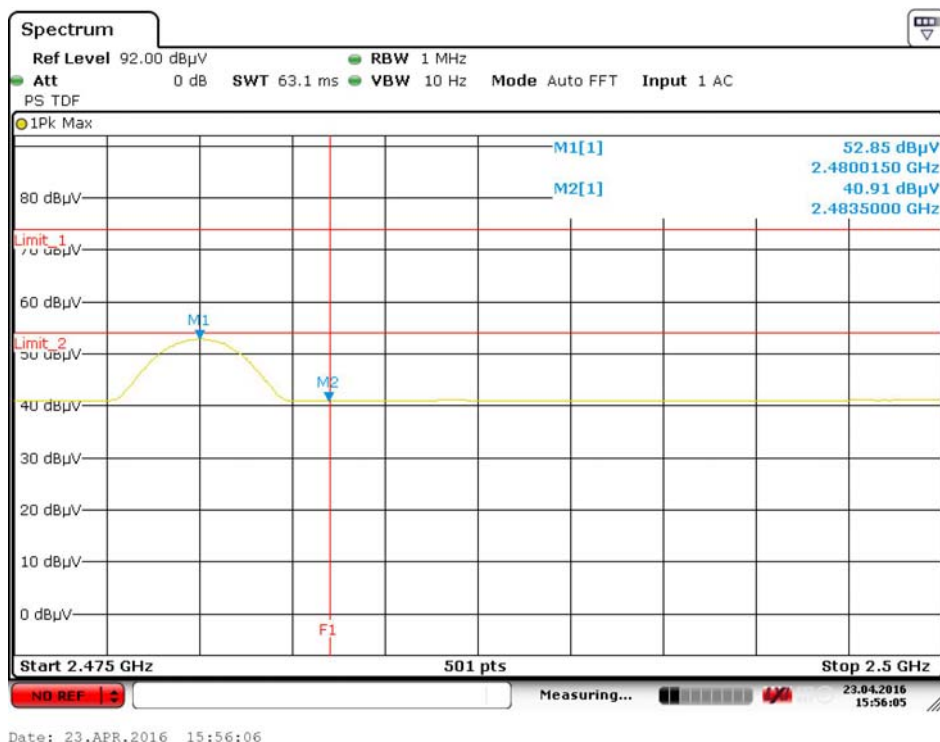
Band edge @ 8-DPSK mode Channel_0 2402MHz Vertical AV



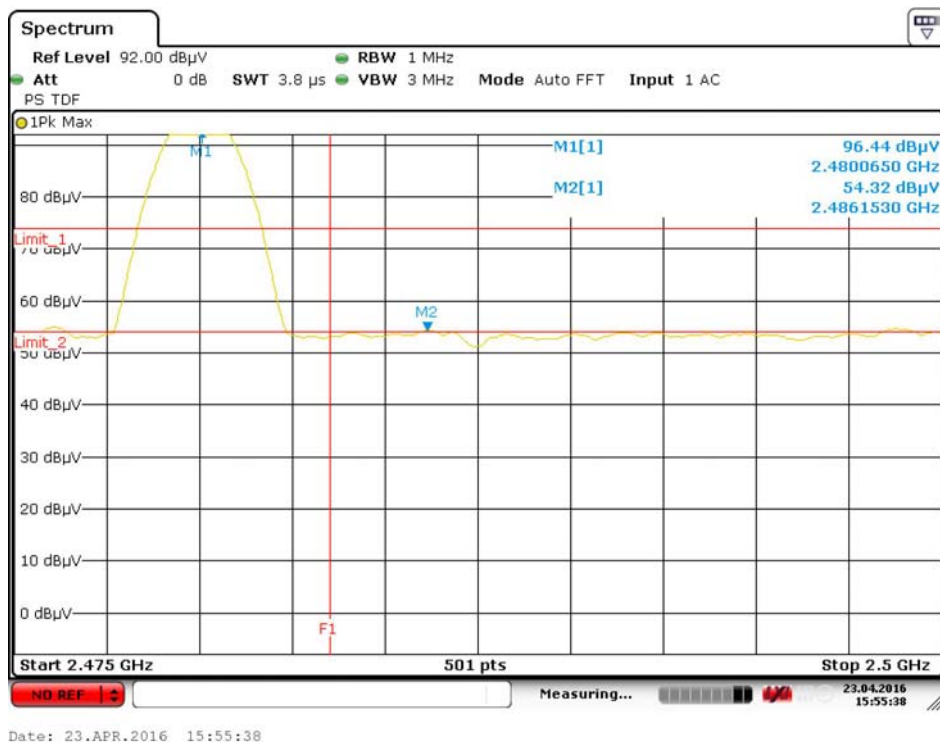
Band edge @ 8-DPSK mode Channel_0 2402MHz Vertical PK



Band edge @ 8-DPSK mode Channel_78 2480MHz Vertical AV



Band edge @ 8-DPSK mode Channel_78 2480MHz Vertical PK

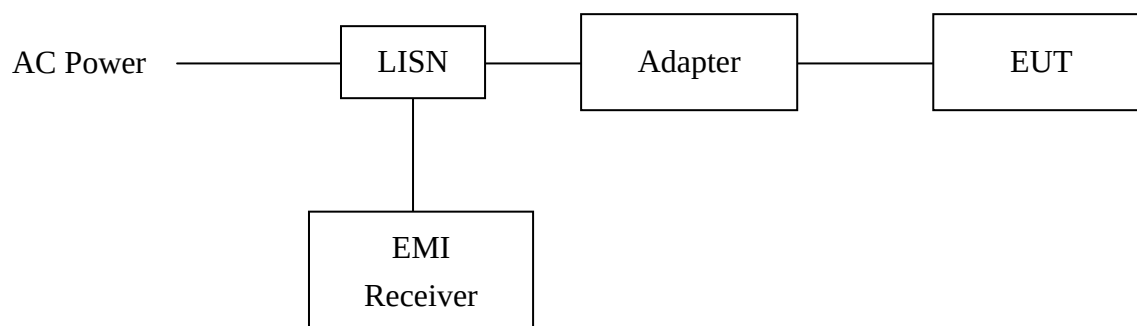


5. Conducted emission test FCC 15.207

5.1 Operating environment

Temperature: 25 °C
Relative Humidity: 50 %
Atmospheric Pressure 1008 hPa

5.2 Test setup & procedure



The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a 50 ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination.

Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.

The bandwidth of the field strength meter (R & S Test Receiver ESCI) is set at 9kHz.

The EUT configurations please refer to the “Conducted set-up photo.pdf”.

5.3 Emission limit

Freq. (MHz)	Conducted Limit (dBuV)	
	Q.P.	Ave.
0.15~0.50	66 – 56*	56 – 46*
0.50~5.00	56	46
5.00~30.0	60	50

*Decreases with the logarithm of the frequency.

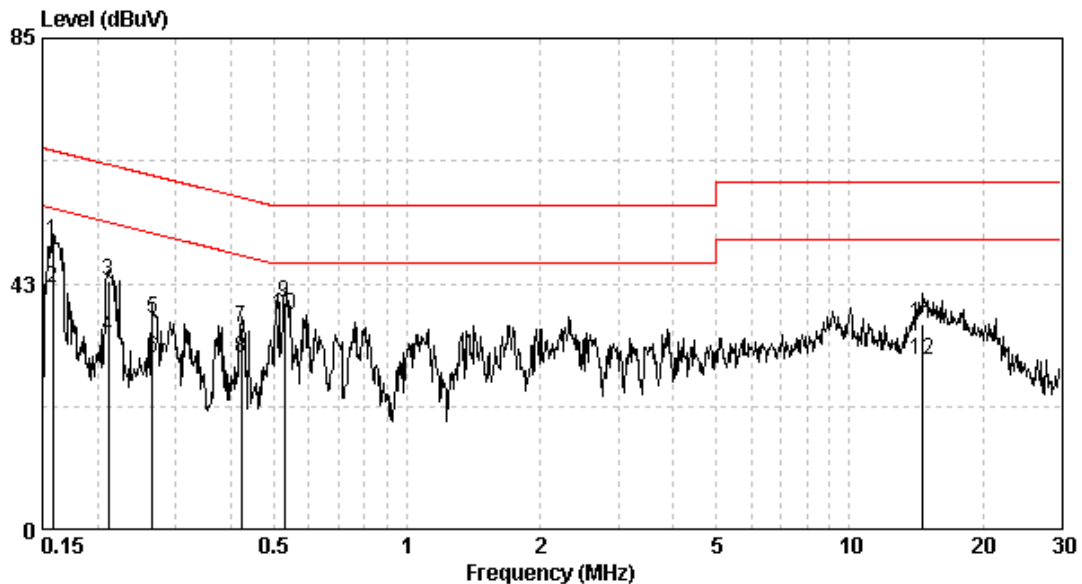
5.4 Conducted emission data FCC 15.207

Phase: Live Line
Model No.: HURESAC-3XE-C
Test Condition: TX mode
Test Voltage: 120 Vac, 60 Hz

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Margin (dB)	
						Qp	Av
0.158	9.74	49.75	65.56	41.75	55.56	-15.81	-13.81
0.212	9.74	43.01	63.14	33.36	53.14	-20.13	-19.78
0.266	9.74	36.39	61.25	29.73	51.25	-24.86	-21.52
0.421	9.73	34.77	57.42	29.50	47.42	-22.65	-17.92
0.527	9.74	39.34	56.00	36.98	46.00	-16.66	-9.02
14.672	9.88	35.41	60.00	29.18	50.00	-24.59	-20.82

Remark:

1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)

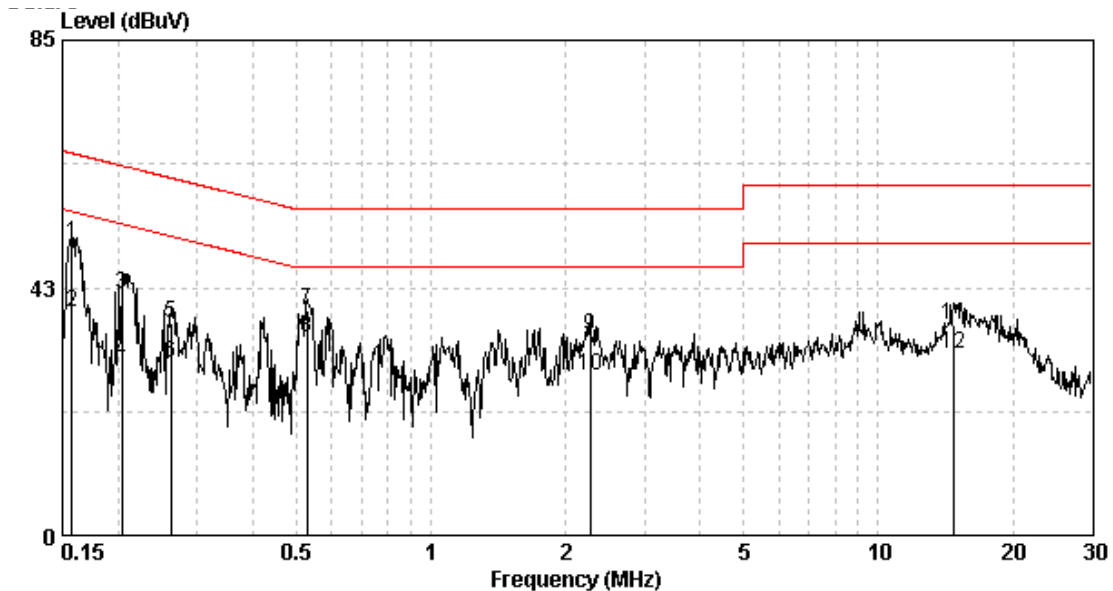


Phase: Neutral Line
Model No.: HURESAC-3XE-C
Test Condition: TX mode
Test Voltage: 120 Vac, 60 Hz

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Margin (dB) Qp	Av
0.157	9.74	50.11	65.60	38.35	55.60	-15.50	-17.26
0.204	9.74	41.42	63.45	29.98	53.45	-22.02	-23.46
0.262	9.74	36.33	61.38	29.59	51.38	-25.05	-21.79
0.529	9.74	38.65	56.00	33.99	46.00	-17.35	-12.01
2.273	9.85	34.20	56.00	27.54	46.00	-21.80	-18.46
14.750	9.92	36.12	60.00	31.01	50.00	-23.88	-18.99

Remark:

1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



6. 20dB Bandwidth test

6.1 Operating environment

Temperature: 25 °C
Relative Humidity: 50 %
Atmospheric Pressure: 1008 hPa

6.2 Test setup & procedure

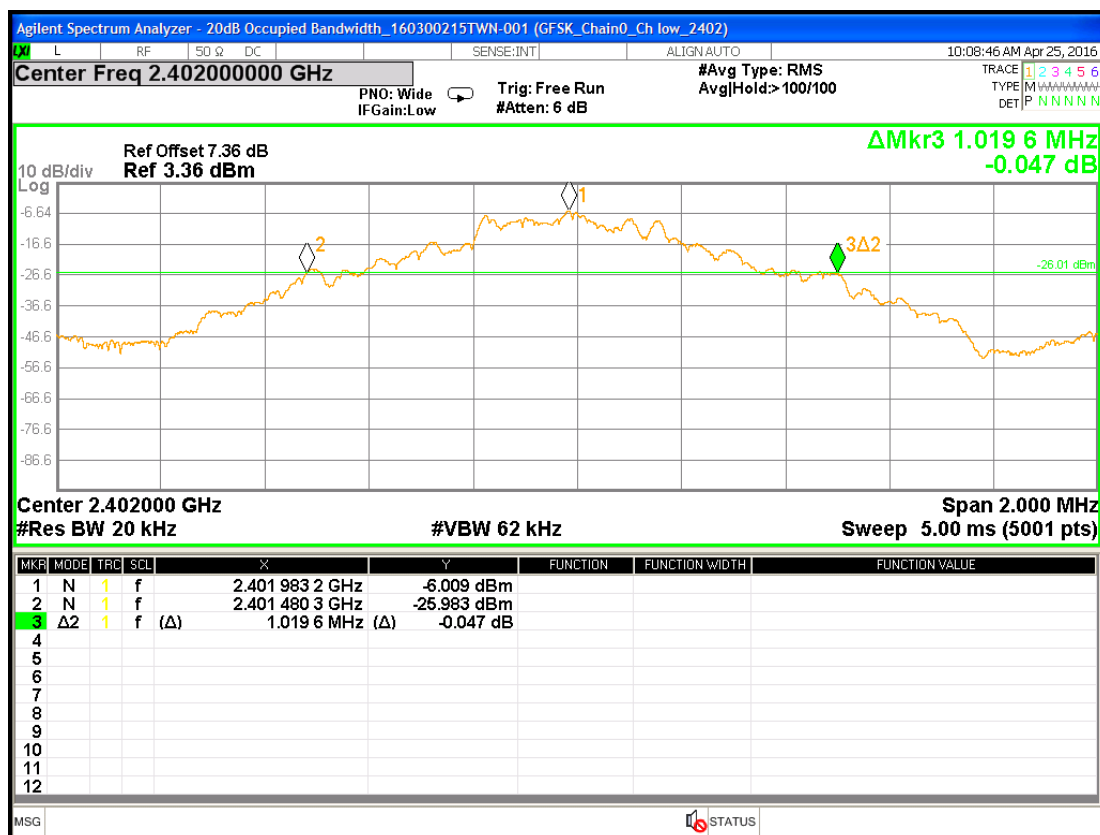
- Step 1: The 20dB bandwidth was measured using a 50 ohm spectrum analyzer
Step 2: The span range for the SA display shall be between two times and five times the OBW.
Step 3: The nominal IF filter bandwidth (3 dB RBW) should be approximately 1 % to 5 % of the OBW, unless otherwise specified, depending on the applicable requirement.
Step 4: The test was performed at 3 channels (lowest, middle and highest channel). The maximum 20dB modulation bandwidth is in the following Table.

6.3 Measured data of modulated bandwidth test results

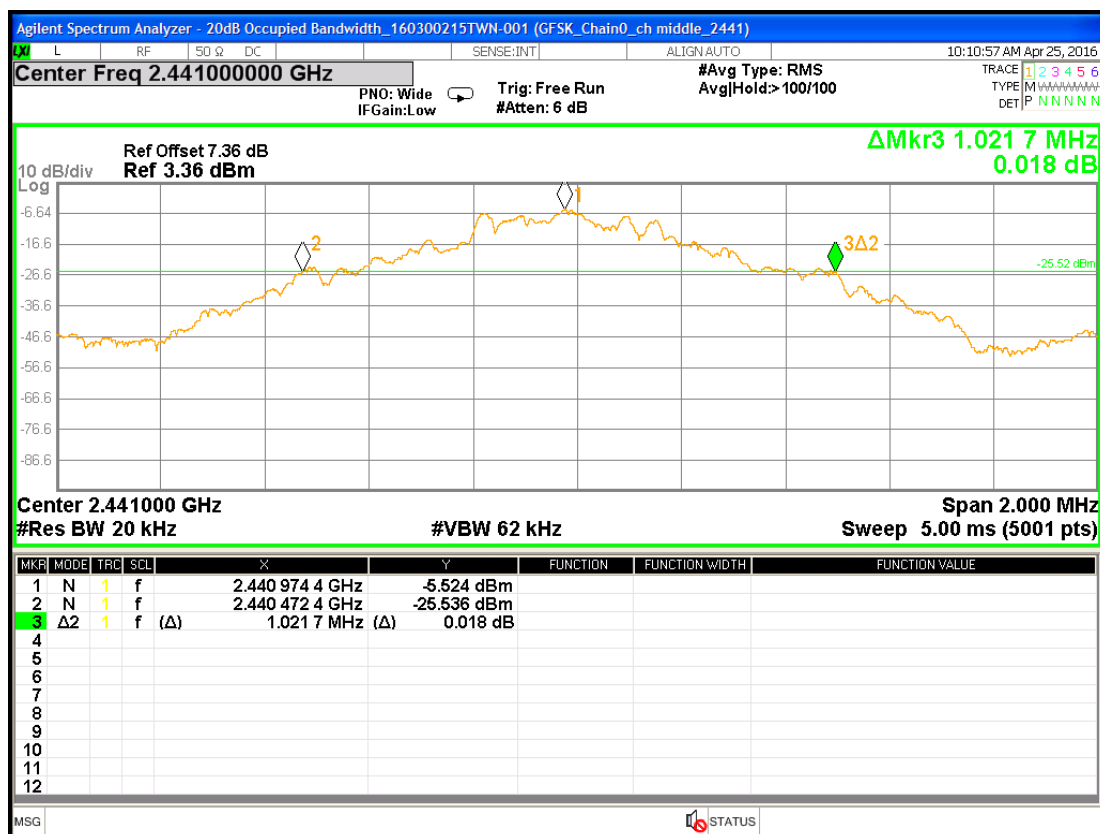
Modulation	Channel	Frequency (MHz)	Data Rate Mbps	20dB Bandwidth(MHz)
GFSK	0	2402	1	1.020
	39	2441		1.022
	78	2480		0.996
$\pi/4$ -DQPSK	0	2402	2	1.319
	39	2441		1.303
	78	2480		1.279
8-DPSK	0	2402	3	1.247
	39	2441		1.249
	78	2480		1.260

Please see the plots from Page 28 through Page 32.

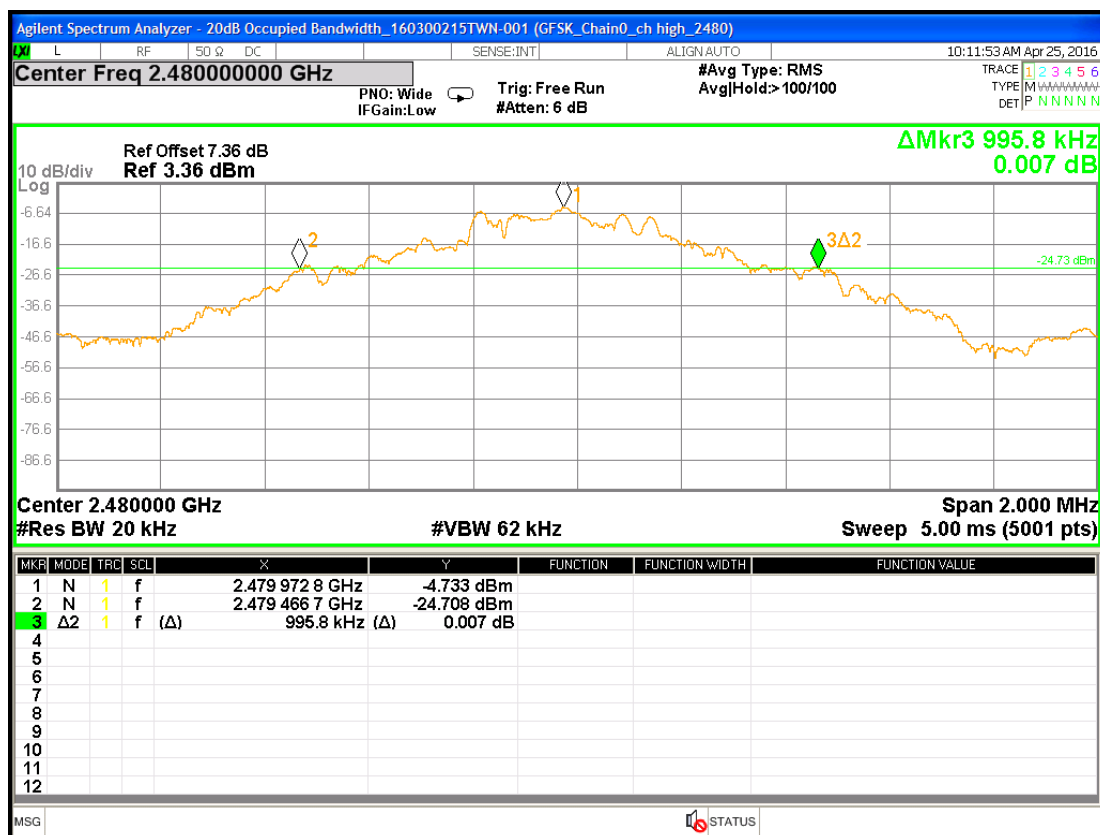
20dB Occupied Bandwidth @ GFSK mode Channel 0 2402MHz



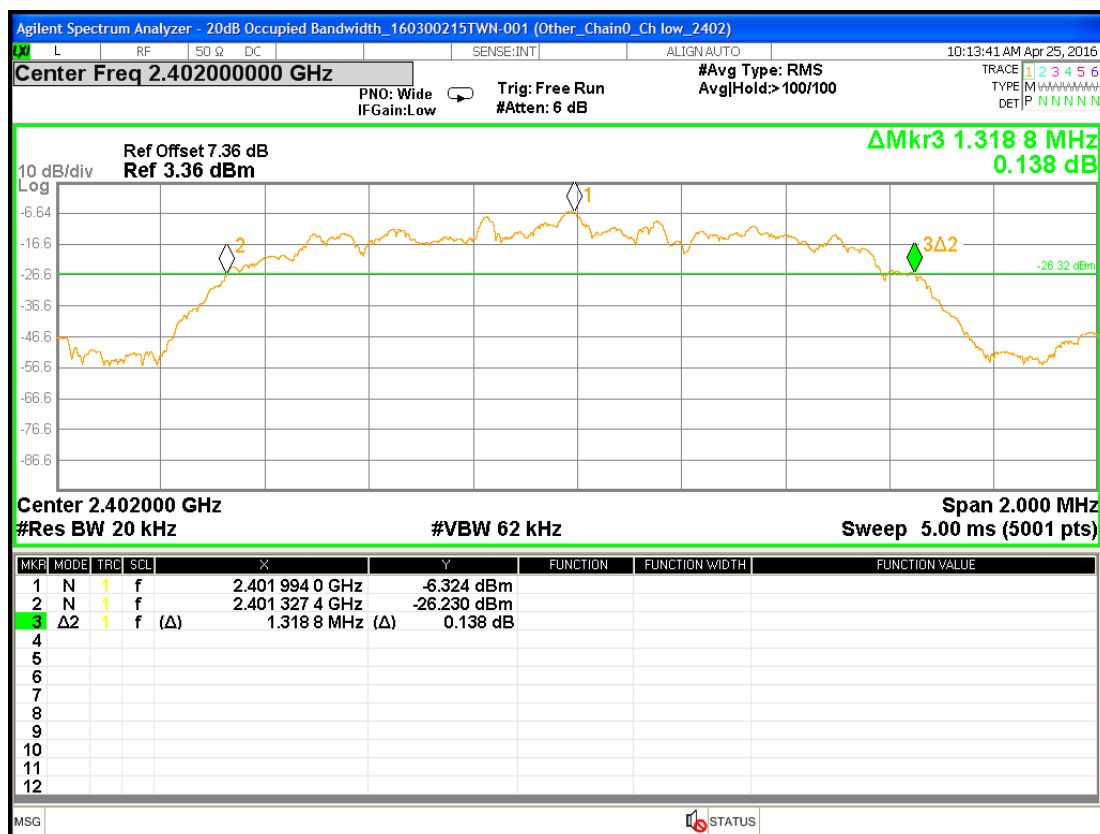
20dB Occupied Bandwidth @ GFSK mode Channel 39 2441MHz



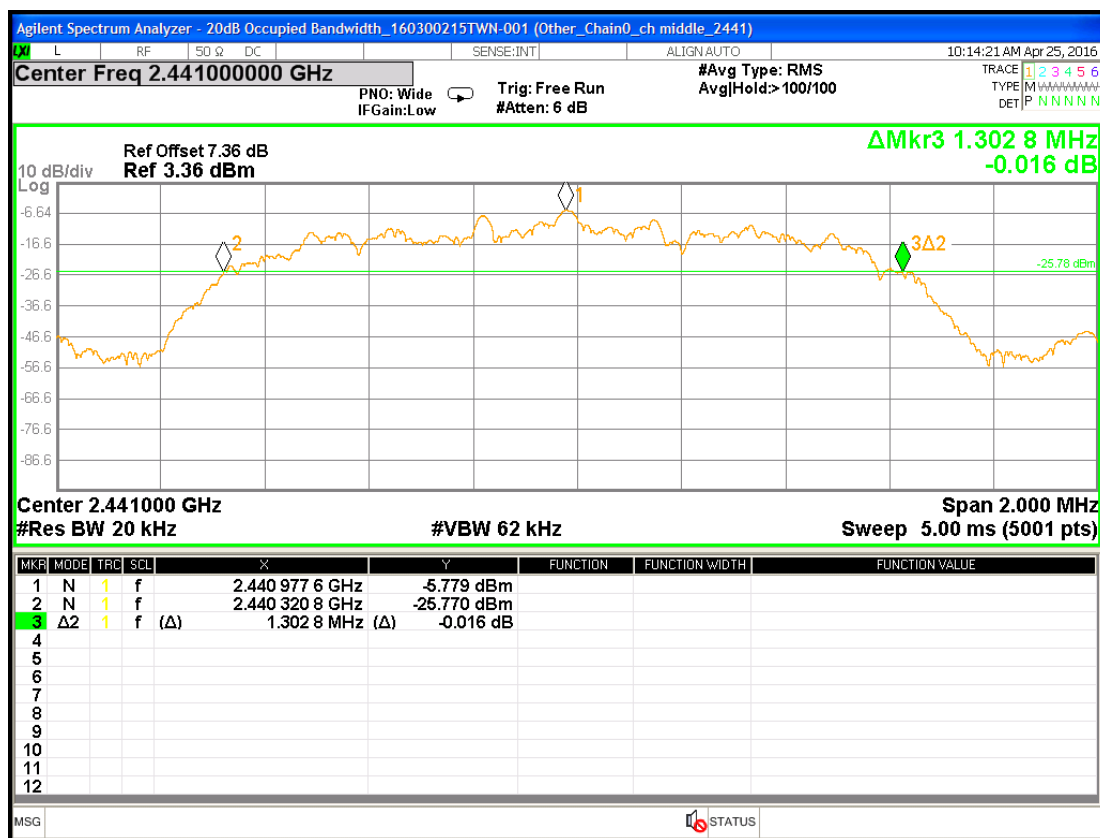
20dB Occupied Bandwidth @ GFSK mode Channel 78 2480MHz



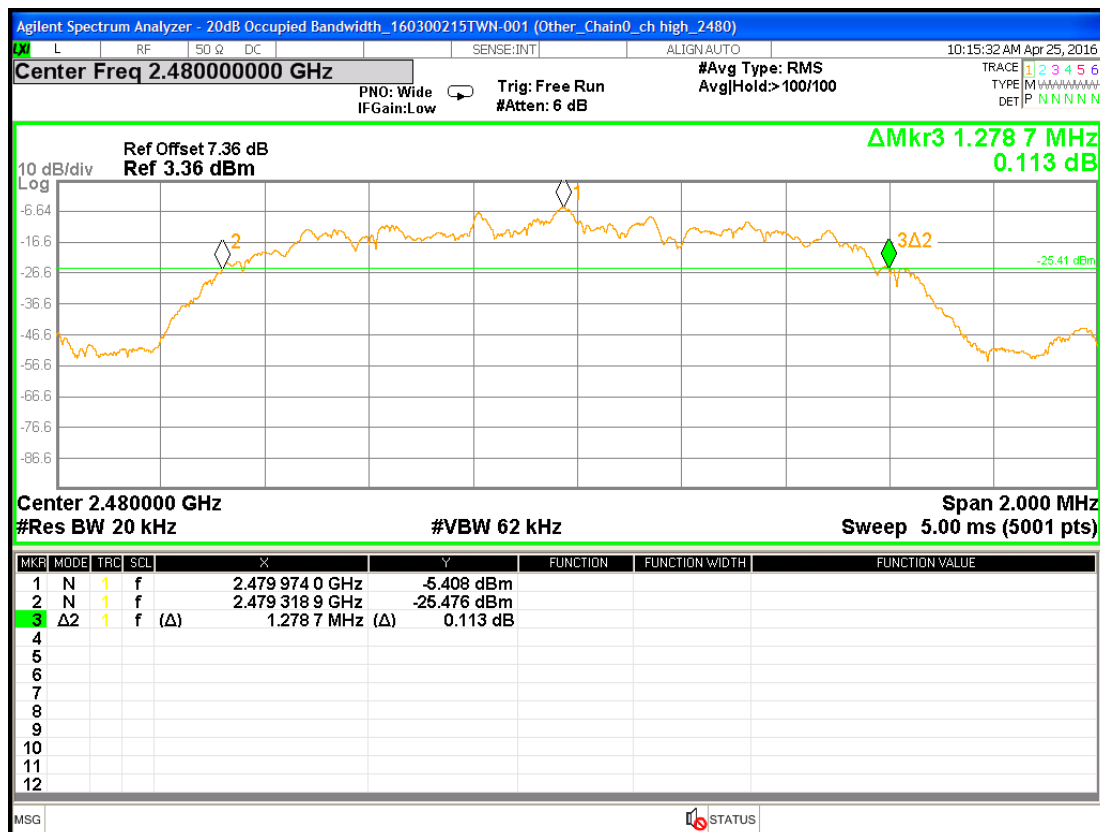
20dB Occupied Bandwidth @ $\pi/4$ -DQPSK mode Channel 0 2402MHz



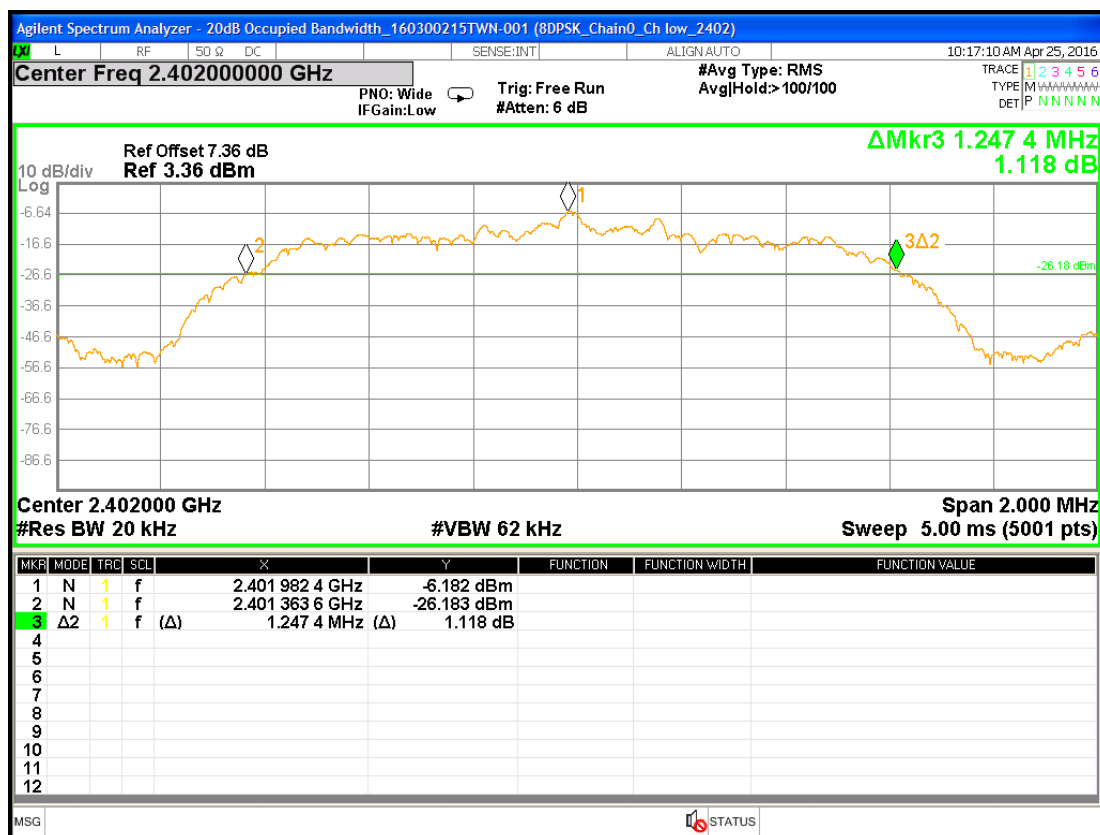
20dB Occupied Bandwidth @ $\pi/4$ -DQPSK mode Channel 39 2441MHz



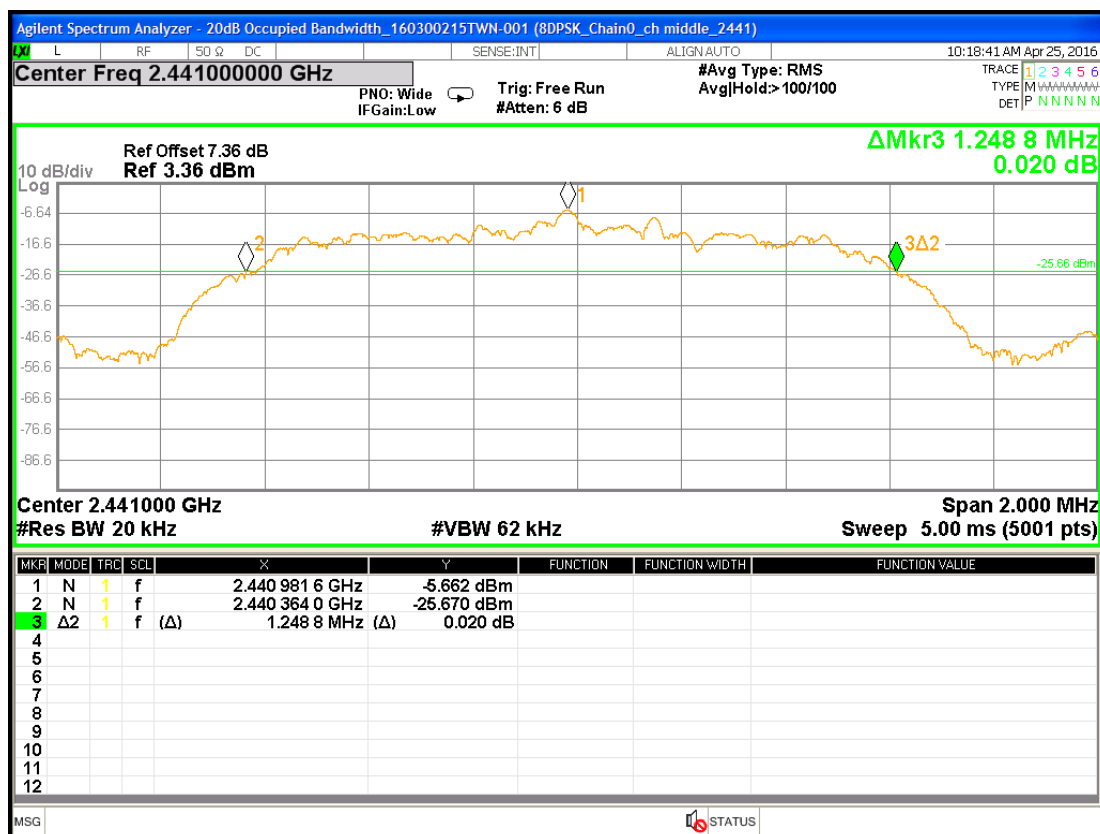
20dB Occupied Bandwidth @ $\pi/4$ -DQPSK mode Channel 78 2480MHz



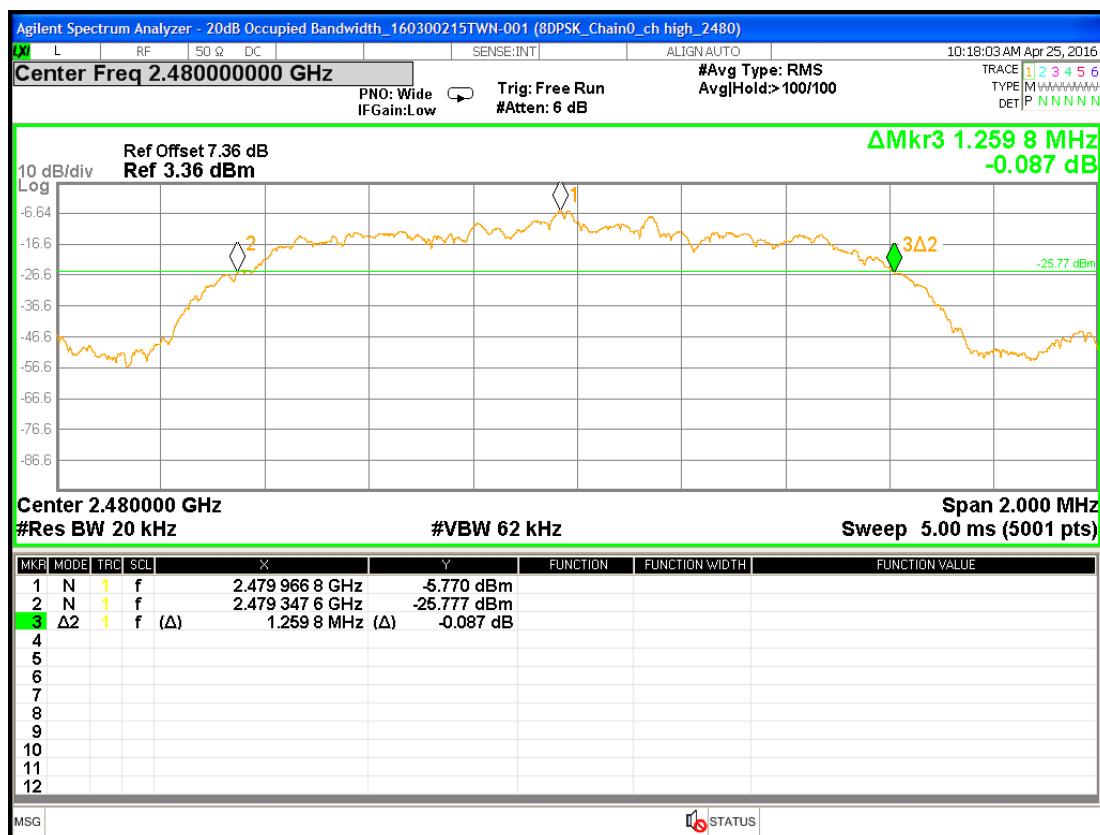
20dB Occupied Bandwidth @ 8DPSK mode Channel 0 2402MHz



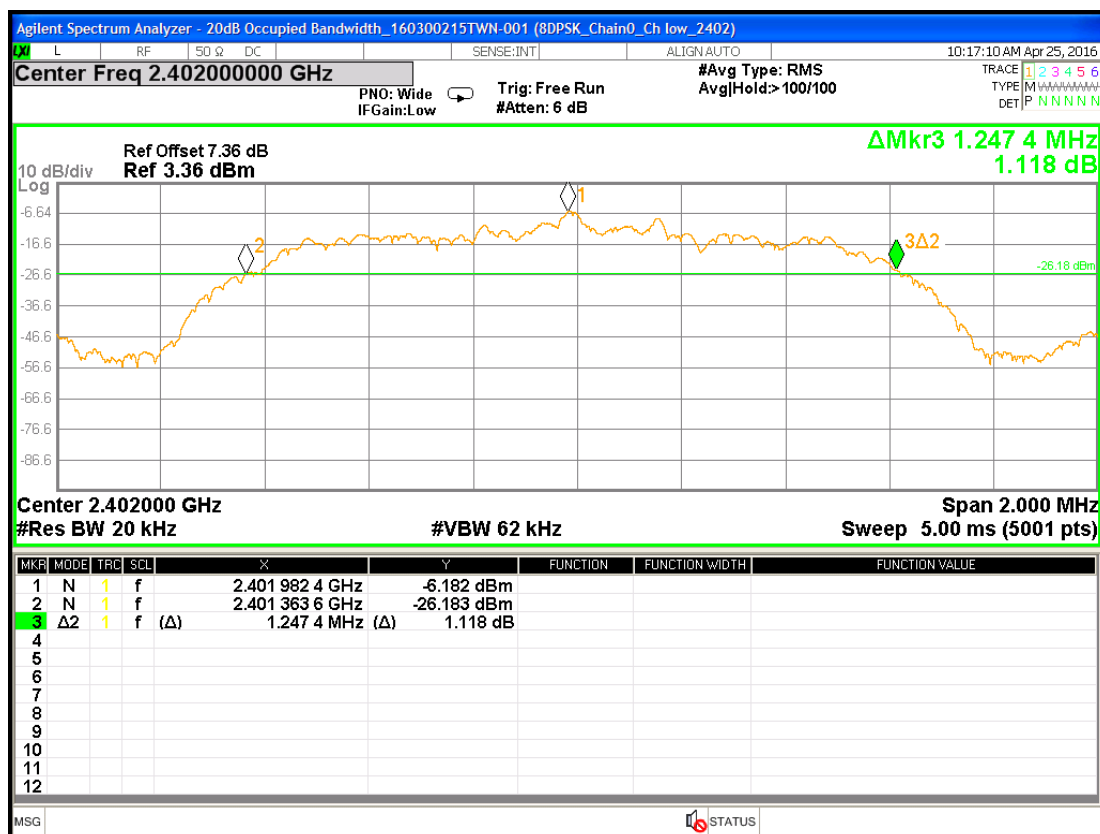
20dB Occupied Bandwidth @ 8DPSK mode Channel 39 2441MHz



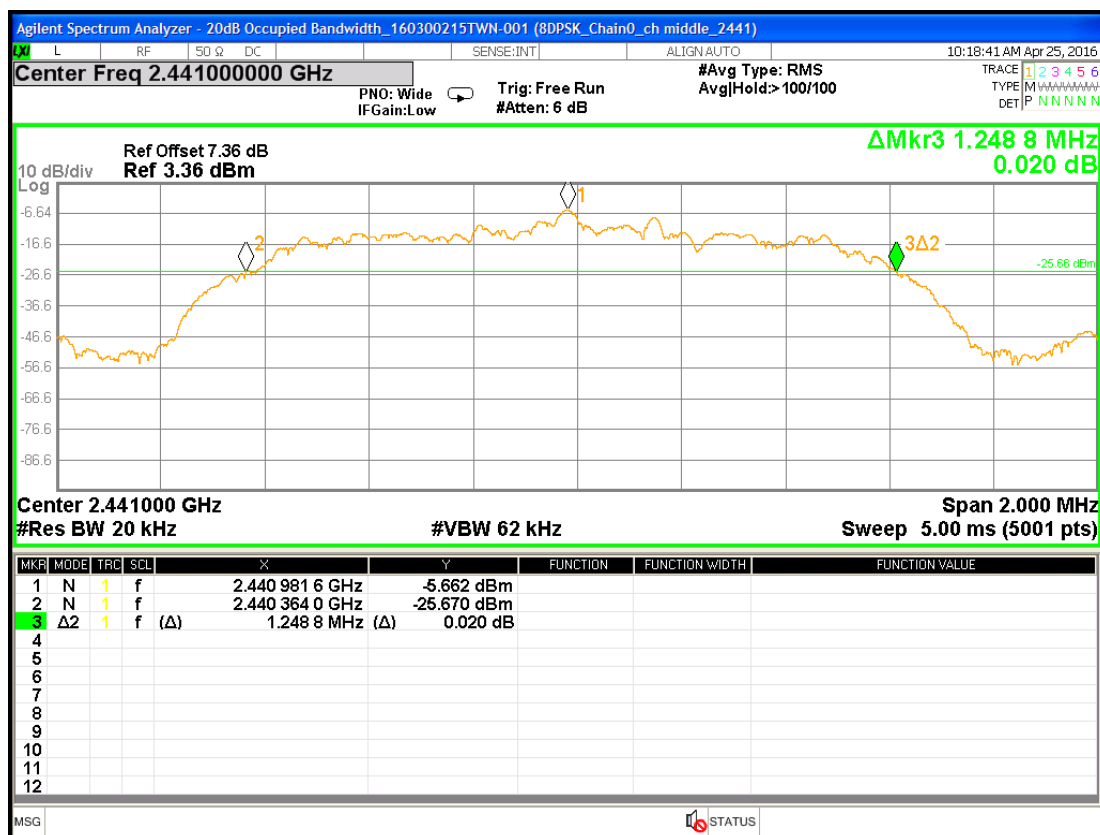
20dB Occupied Bandwidth @ 8DPSK mode Channel 78 2480MHz



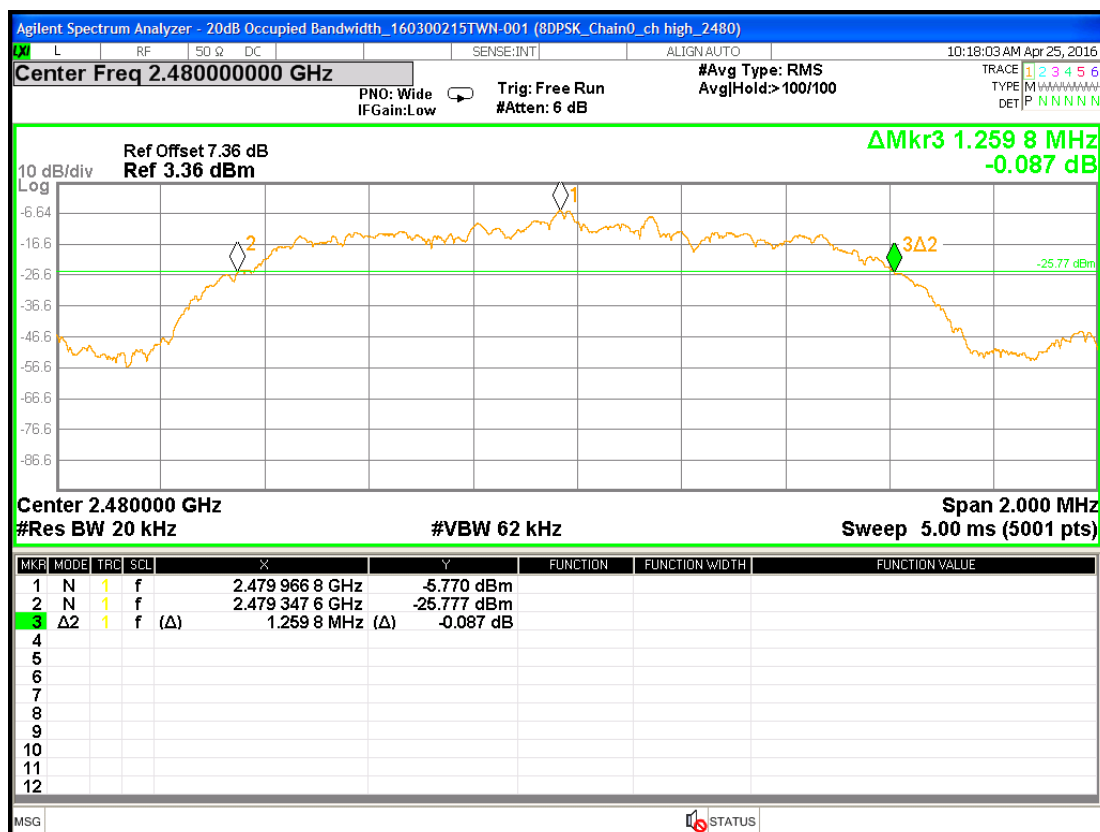
20dB Occupied Bandwidth @ 8DPSK mode Channel 0 2402MHz



20dB Occupied Bandwidth @ 8DPSK mode Channel 39 2441MHz



20dB Occupied Bandwidth @ 8DPSK mode Channel 78 2480MHz



Appendix A: Test equipment list

Equipment	Brand	Model No.	Serial No.	Calibration Date	Next Calibration Date
ESCI EMI Test Receiver	Rohde & Schwarz	ESCI	100018	2015/12/02	2016/11/30
Spectrum Analyzer	Rohde & Schwarz	FSP30	100137	2015/08/18	2016/08/16
Horn Antenna (1-18G)	SHWARZBECK	BBHA 9120 D	9120D-456	2014/08/29	2017/08/27
Horn Antenna (14-42G)	SHWARZBECK	BBHA 9170	BBHA9170159	2014/09/16	2017/09/14
Broadband Antenna	SHWARZBECK	VULB 9168	9168-172	2013/08/08	2016/08/06
Pre-Amplifier	EMC Co.	EMC12635SE	980205	2015/10/7	2016/10/05
Pre-Amplifier	MITEQ	JS4-26004000--27-8A	828825	2015/09/15	2016/09/13
Power Meter	Anritsu	ML2495A	0844001	2015/11/11	2016/11/09
Power Sensor	Anritsu	MA2411B	0738452	2015/11/11	2016/11/09
Two-Line V-Network	Rohde & Schwarz	ENV216	101159	2015/06/08	2016/06/06
Artificial Mains Network (LISN)	Schaffner	MN2050D	1586	2015/05/27	2016/05/25
CON-1 Cable	SUHNER	BNC / RG-58	1521946	2015/05/09	2016/05/07
Test software	Audix	e3	4.2004-1-12k	NCR	NCR
Signal Analyzer	Agilent	N9030A	MY51380492	2015/09/21	2016/09/19
966-2(A) Cable 9kHz~26.5GHz	SUHNER	SMA / EX 100	N/A	2015/05/06	2016/05/05
966-2(B) Cable 9kHz~26.5GHz	SUHNER	SMA / SUCOFLEX 104P	CB0005	2015/05/06	2016/05/04

Equipment	Brand	Model No.	Serial No.	Calibration Date	Next Calibration Date
RF Cable 9kHz~26.5GHz	SUHNER	SUCOFLEX 102	CB0006	2015/05/06	2016/05/05
966-2_3m Semi-Anechoic Chamber	966_2	CEM-966_2	N/A	2016/02/24	2017/02/22
High Pass Filter	Reactel	7HS-3G/18G-S11	N/A	2015/06/06	2016/06/04
Active Loop Antenna	SCHWARZBECK MESS-ELEKTRONIC	FMZB1519	1519-067	2016/03/03	2017/03/02
EMI Test Receiver	Rohde & Schwarz	ESR-7	101232	2015/12/02	2016/11/30
Test software	ADT	Radiated test system	7.5.14	NCR	NCR

Note: No Calibration Required (NCR).

Appendix B: Measurement Uncertainty

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

Item	Uncertainty
Vertically polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m	5.14 dB
Horizontally polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m	5.22 dB
Vertically polarized Radiated disturbances from 1GHz~18GHz in a semi-anechoic chamber at a distance of 3m	3.64 dB
Horizontally polarized Radiated disturbances from 1GHz~18GHz in a semi-anechoic chamber at a distance of 3m	3.64 dB
Vertically polarized Radiated disturbances from 18GHz~40GHz in a semi-anechoic chamber at a distance of 3m	2.7 dB
Horizontally polarized Radiated disturbances from 18GHz~40GHz in a semi-anechoic chamber at a distance of 3m	2.7 dB
Radiated disturbances from 9kHz~30MHz in a semi-anechoic chamber at a distance of 3m	3.53 dB
Emission on the Band Edge Test	3.64 dB
20dB Bandwidth	0.85 dB
AC Power Line Conducted Emission	2.47 dB