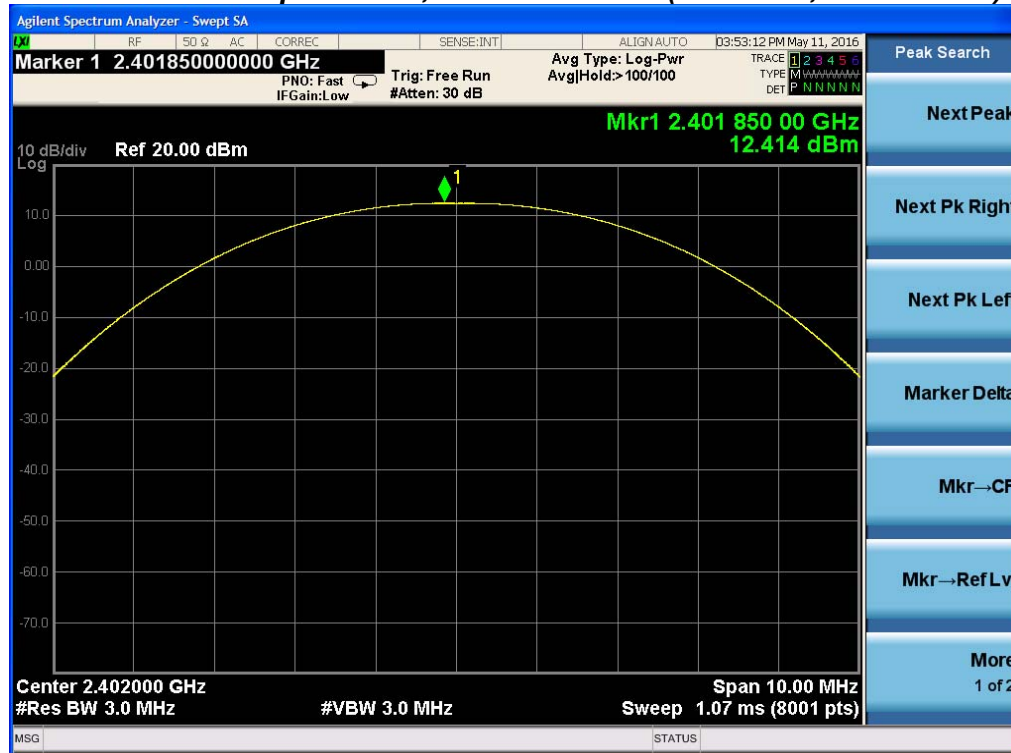
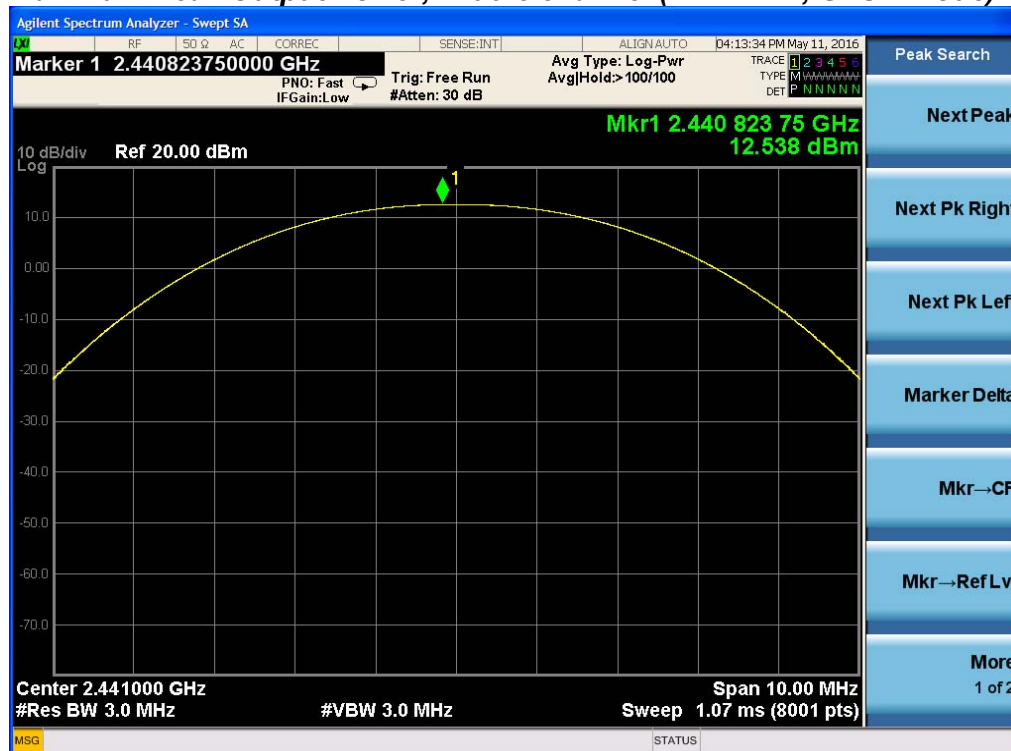


PLOT OF TEST DATA

Maximum Peak Output Power, Lowest channel (2402 MHz, GFSK mode)

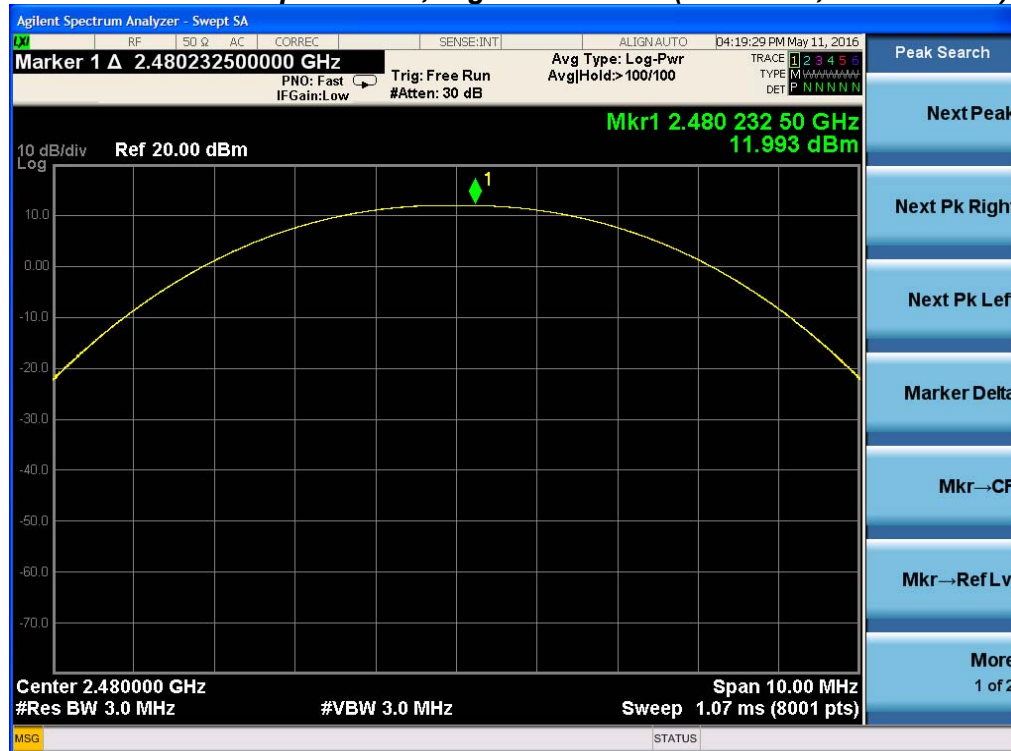


Maximum Peak Output Power, Middle channel (2441 MHz, GFSK mode)

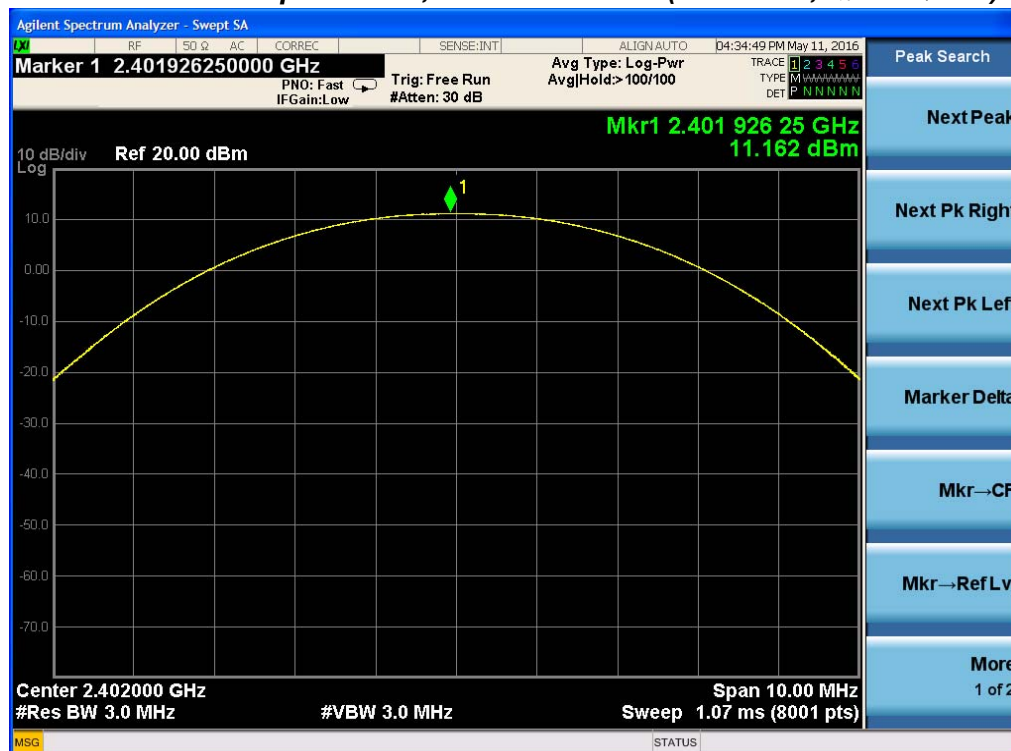


PLOT OF TEST DATA

Maximum Peak Output Power, Highest channel (2480 MHz, GFSK mode)

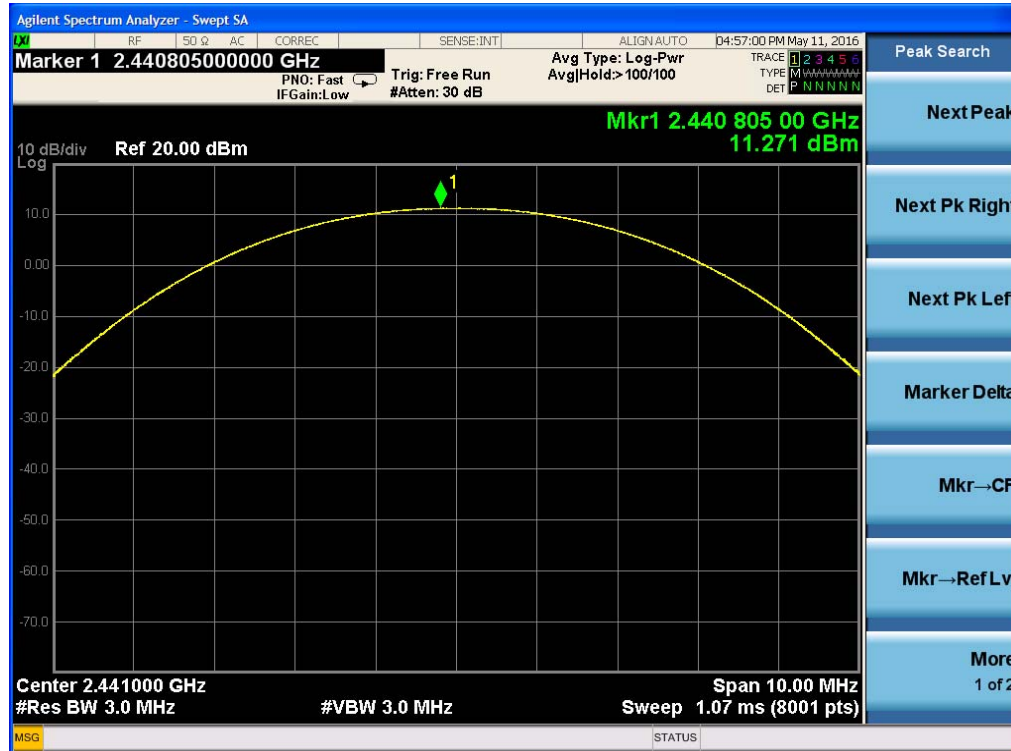


Maximum Peak Output Power, Lowest channel (2402 MHz, $\pi/4$ QPSK)

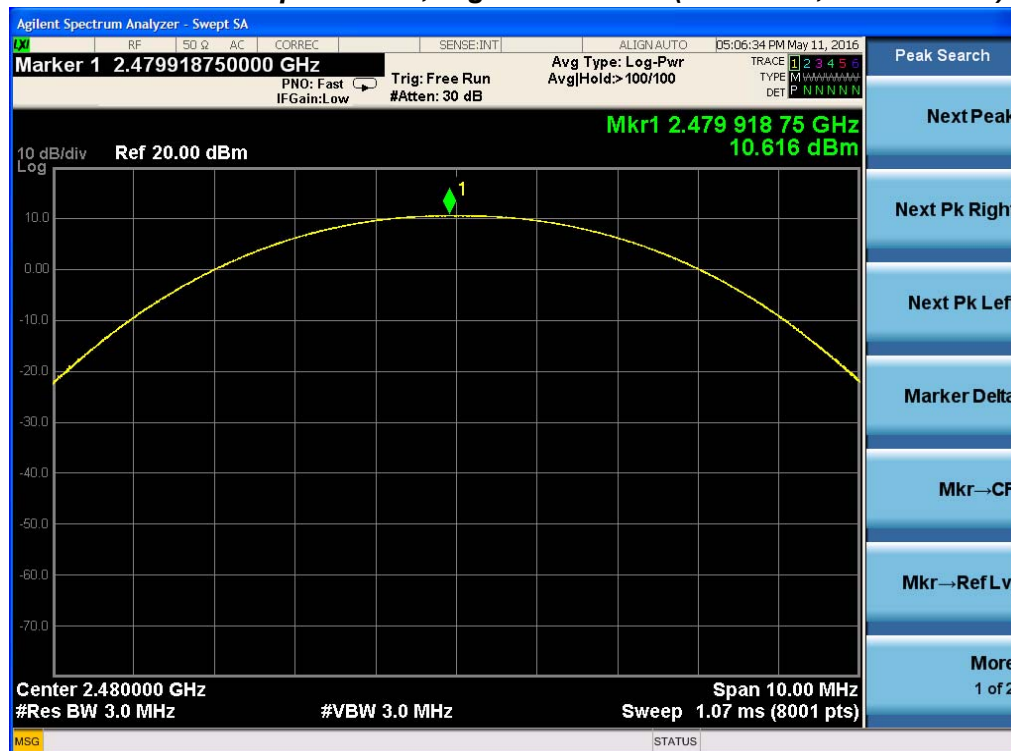


PLOT OF TEST DATA

Maximum Peak Output Power, Middle channel (2441 MHz, $\pi/4$ DQPSK)

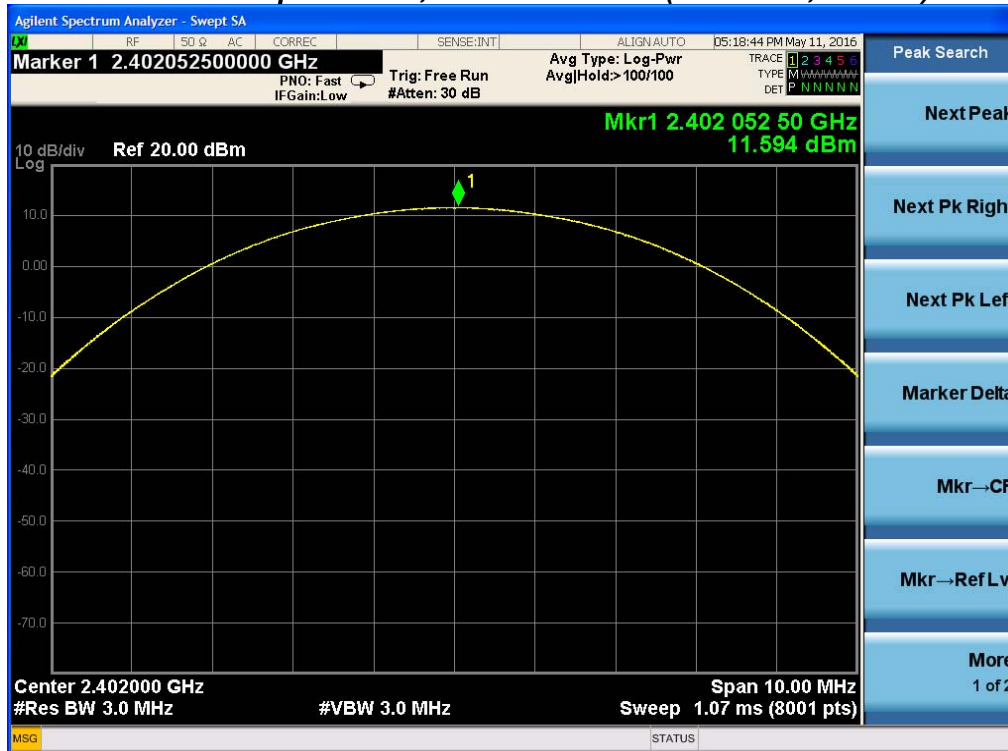


Maximum Peak Output Power, Highest channel (2480 MHz, $\pi/4$ DQPSK)

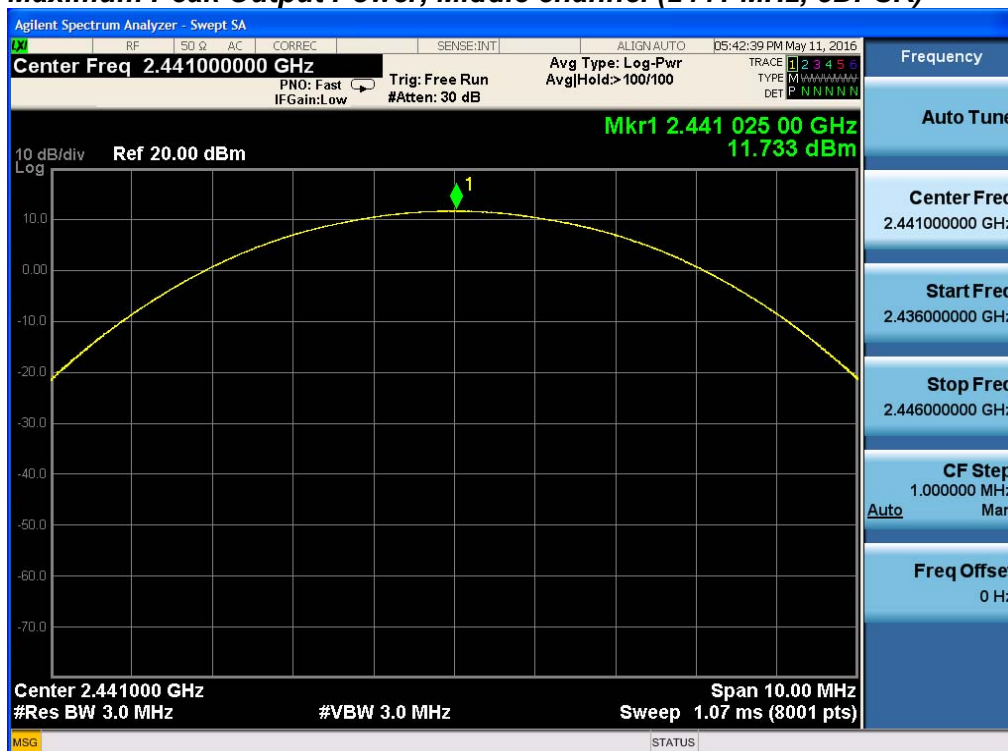


PLOT OF TEST DATA

Maximum Peak Output Power, Lowest channel (2402 MHz, 8DPSK)

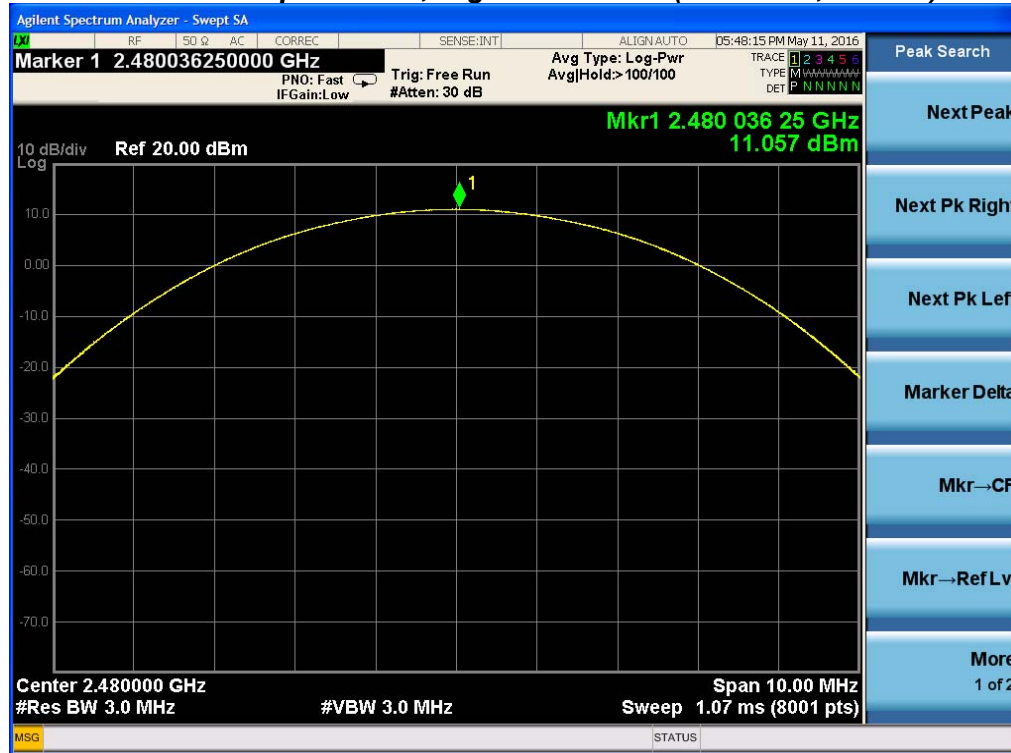


Maximum Peak Output Power, Middle channel (2441 MHz, 8DPSK)



PLOT OF TEST DATA

Maximum Peak Output Power, Highest channel (2480 MHz, 8DPSK)



TEST DATA

8.7 Conducted Spurious Emission

FCC §15.247(d), IC RSS-247 Issue 1, 5.5

Test Mode : Set to Lowest channel, Middle channel and Highest channel

Result

Modulation Mode	Frequency (MHz)	Result	Limit (dBc)
GFSK	2402	More than 20 dBc	20
GFSK	2441	More than 20 dBc	20
GFSK	2480	More than 20 dBc	20
$\pi/4$ DQPSK	2402	More than 20 dBc	20
$\pi/4$ DQPSK	2441	More than 20 dBc	20
$\pi/4$ DQPSK	2480	More than 20 dBc	20
8DPSK	2402	More than 20 dBc	20
8DPSK	2441	More than 20 dBc	20
8DPSK	2480	More than 20 dBc	20

Note:

The cable and attenuator loss from 30 MHz to 25 GHz was reflected in spectrum analyzer with correction factor for the spurious emissions test.

PLOT OF TEST DATA

Conducted Spurious Emissions, 30 MHz ~ 26.5 GHz (2402 MHz, GFSK Mode)



Conducted Spurious Emissions, 30 MHz ~ 26.5 GHz (2441 MHz, GFSK Mode)



PLOT OF TEST DATA

Conducted Spurious Emissions, 30 MHz ~ 26.5 GHz (2480 MHz, GFSK Mode)



Conducted Spurious Emissions, 30 MHz ~ 26.5 GHz(2402 MHz, $\pi/4$ DQPSK Mode)



PLOT OF TEST DATA

Conducted Spurious Emissions, 30 MHz ~ 26.5 GHz(2441 MHz, $\pi/4$ DQPSK Mode)



Conducted Spurious Emissions, 30 MHz ~ 26.5 GHz(2480 MHz, $\pi/4$ DQPSK Mode)



PLOT OF TEST DATA

Conducted Spurious Emissions, 30 MHz ~ 26.5 GHz (2402 MHz, 8DPSK Mode)

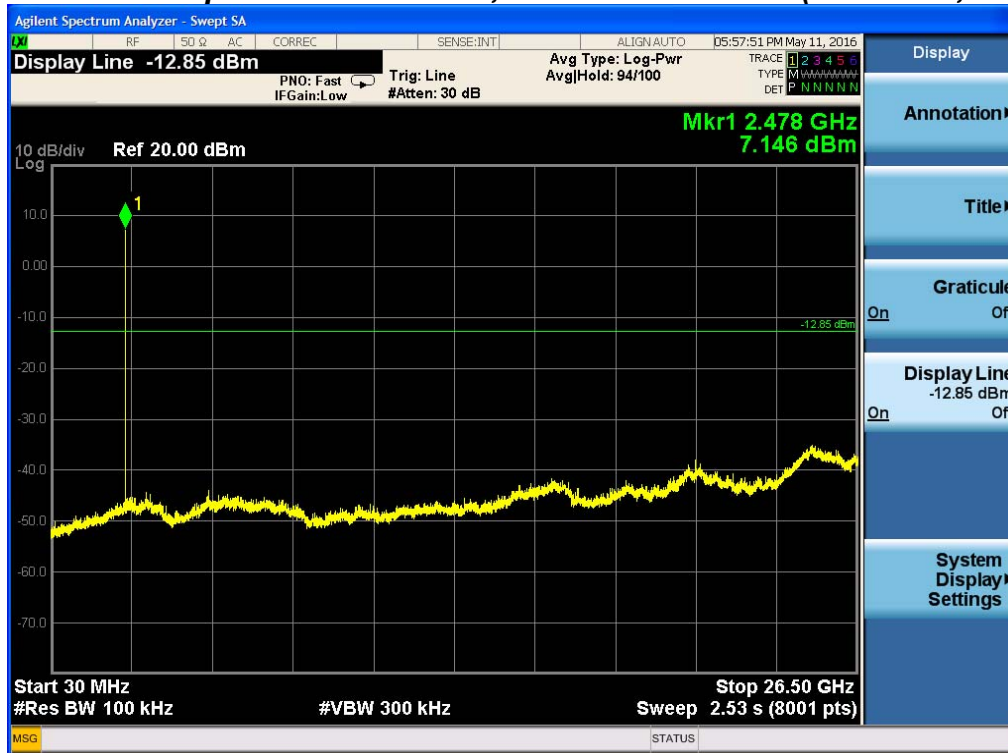


Conducted Spurious Emissions, 30 MHz ~ 26.5 GHz (2441 MHz, 8DPSK Mode)



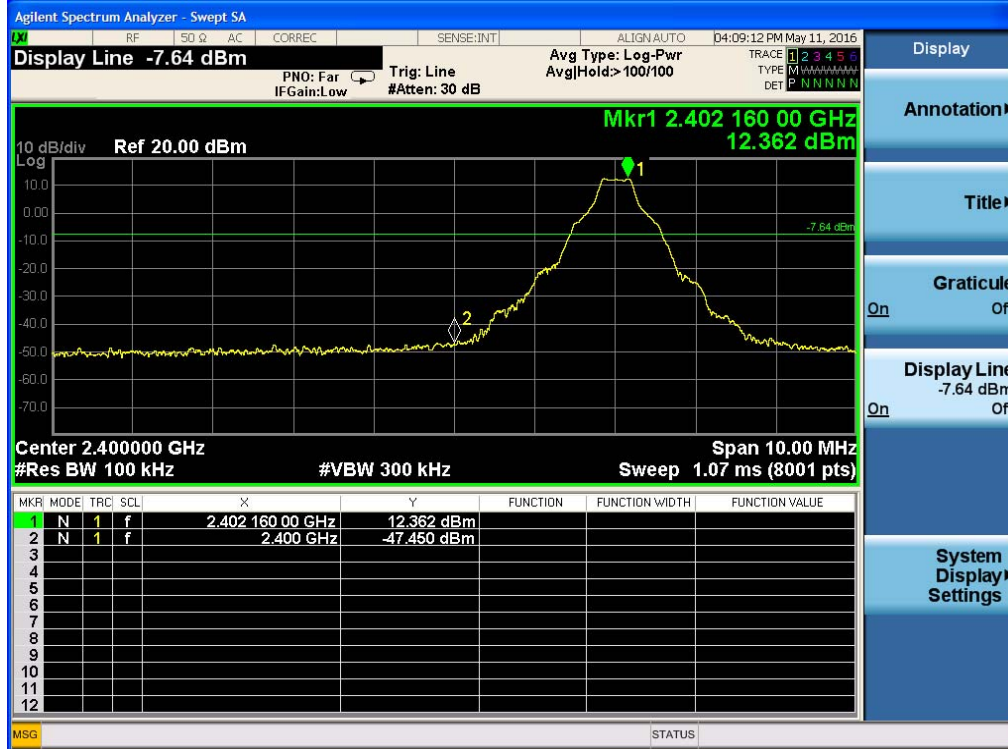
PLOT OF TEST DATA

Conducted Spurious Emissions, 30 MHz ~ 26.5 GHz (2480 MHz, 8DPSK Mode)



PLOT OF TEST DATA

Band Edge Lowest Channel (2402 MHz, GFSK, Non-hopping mode)



Band Edge Lowest Channel (2402 MHz, GFSK, Hopping mode)



PLOT OF TEST DATA

Band Edge Highest Channel (2480 MHz, GFSK, Non-hopping mode)



Band Edge Highest Channel (2480 MHz, GFSK, Hopping mode)

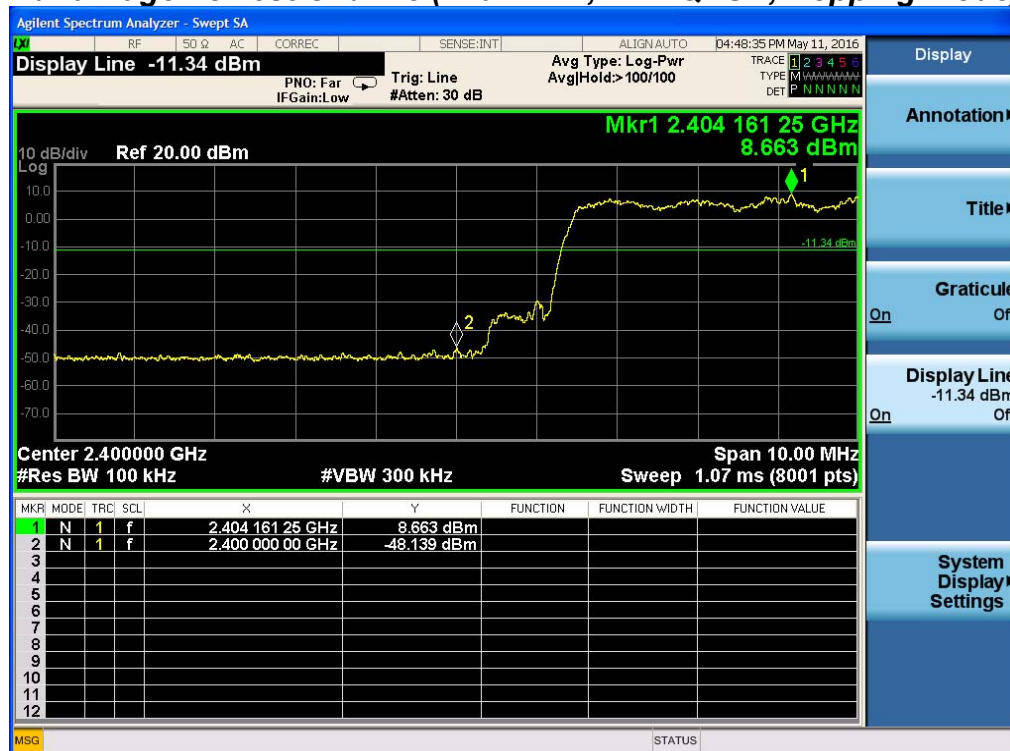


PLOT OF TEST DATA

Band Edge Lowest Channel(2402 MHz, $\pi/4$ DQPSK, Non-hopping mode)



Band Edge Lowest Channel(2402 MHz, $\pi/4$ DQPSK, Hopping mode)



PLOT OF TEST DATA

Band Edge Highest Channel(2480 MHz, $\pi/4$ DQPSK, Non-hopping mode)

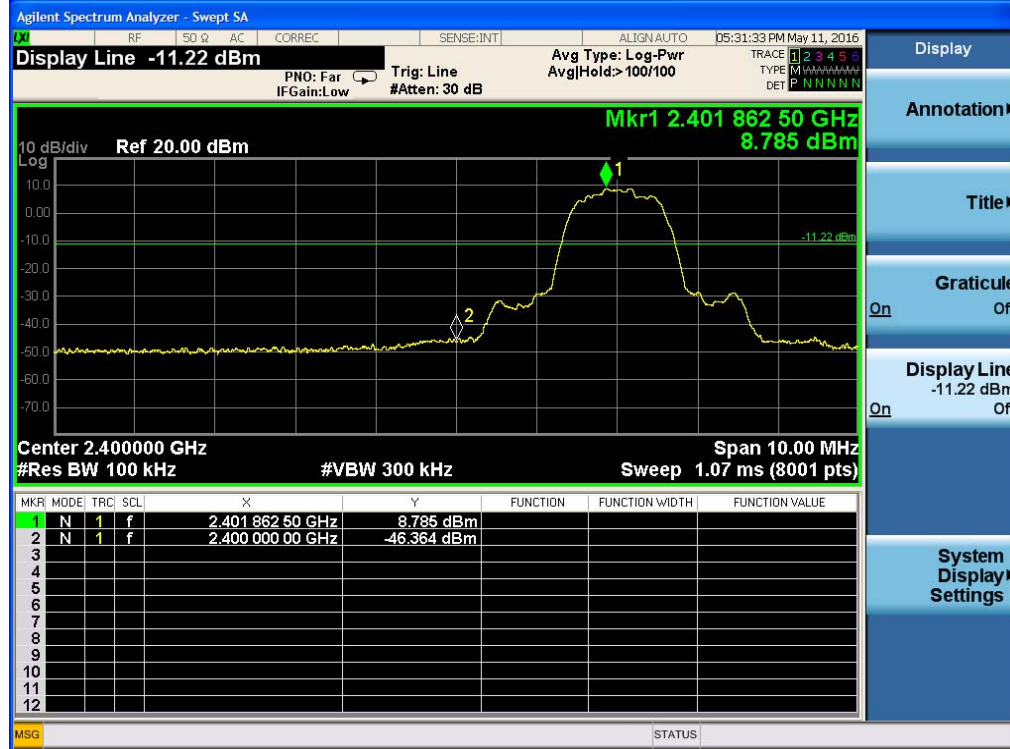


Band Edge Highest Channel(2480 MHz, $\pi/4$ DQPSK, Hopping mode)



PLOT OF TEST DATA

Band Edge Lowest Channel(2402 MHz, 8DPSK, Non-hopping mode)



Band Edge Lowest Channel(2402 MHz, 8DPSK, Hopping mode)



PLOT OF TEST DATA

Band Edge Highest Channel(2480 MHz, 8DPSK, Non-hopping mode)



Band Edge Highest Channel(2480 MHz, 8DPSK, Hopping mode)



TEST DATA

8.8 Radiated Spurious Emission

FCC §15.247(d), IC RSS-247 Issue 1, 5.5

Test Mode : Set to Lowest channel, Middle channel and Highest channel

Result

Lowest Channel

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4804.01	44.3	H	peak	9.4	53.7	74.0	20.3
4804.01	32.5	H	average	9.4	41.9	54.0	12.1

Middle Channel

Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4882.19	44.1	H	peak	9.7	53.8	74.0	20.2
4882.19	33.0	H	average	9.7	42.7	54.0	11.3

Highest Channel

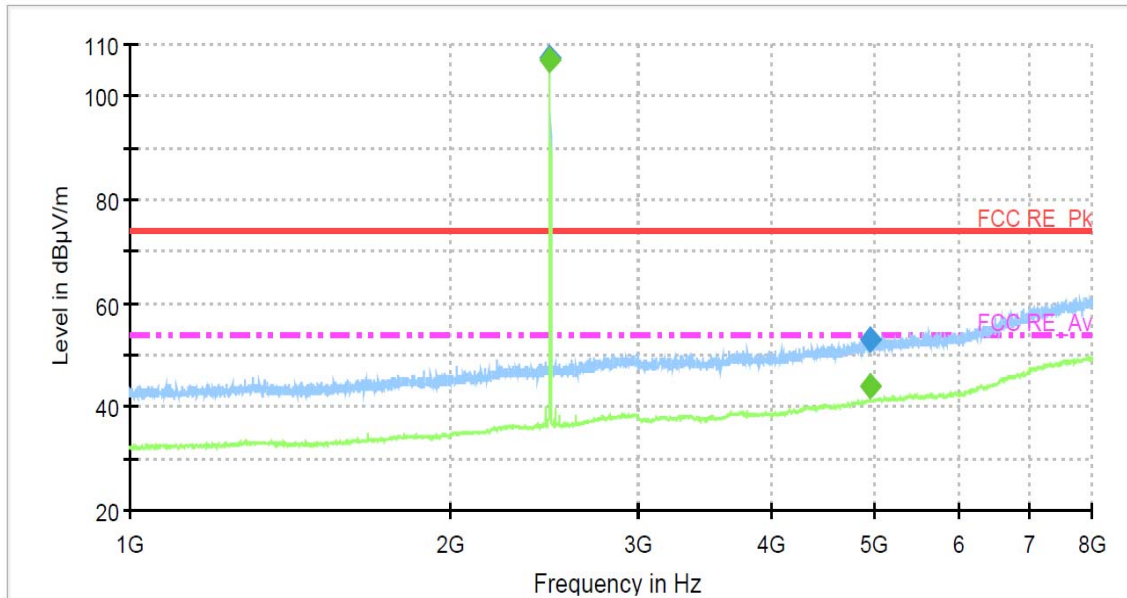
Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4960.13	44.0	H	peak	9.9	53.9	74.0	20.1
4960.13	34.4	H	average	9.9	44.3	54.0	9.7

Notes:

1. *Pol. H = Horizontal V = Vertical
2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
3. Other spurious was under 20 dB below Fundamental.
4. GFSK modulation mode was the worst condition.
5. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.
6. Peak emissions were measured using RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.
7. Average emissions were measured using RBW = 1 MHz, VBW = 1 kHz, Detector = Peak.
8. The spectrum was measured from 9 kHz to 10th harmonic and the worst-case emissions were reported. No significant emissions were found beyond the 2nd harmonic for this device.

PLOTS OF EMISSIONS

Worst Case : 2480 MHz GFSK modulation : 1 GHz to 8 GHz



TEST DATA

8.9 Radiated Bandedge

FCC §15.247(d), IC RSS-247 Issue 1, 5.5

Test Mode : Set to Lowest channel, Highest channel

Result

Lowest and Highest Channels

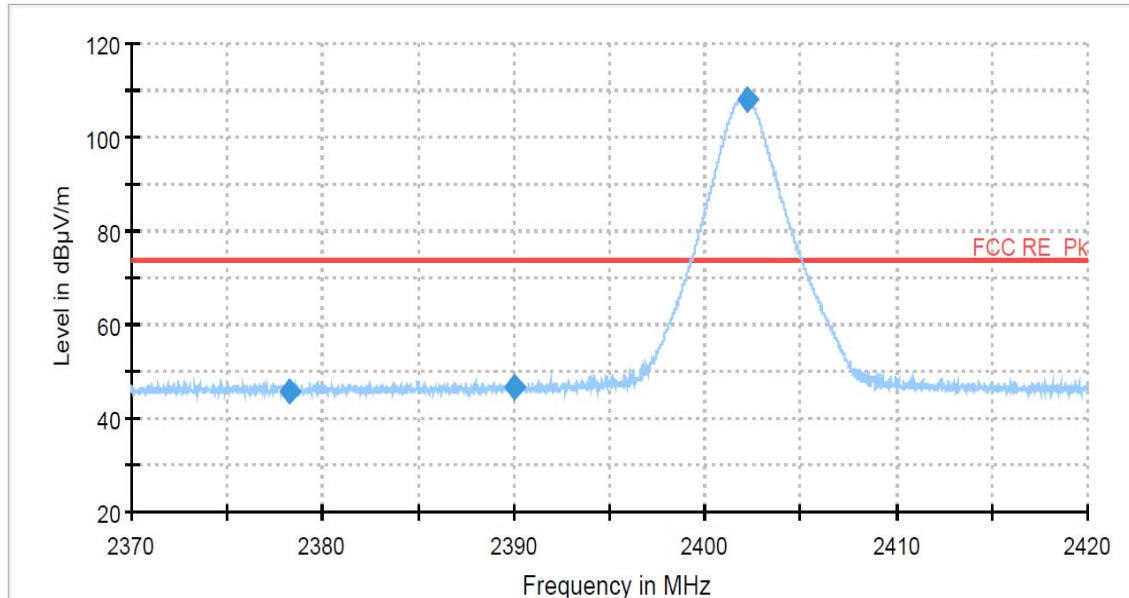
Frequency (MHz)	Reading (dBμV)	Pol* (H/V)	mode	AF+CL+Amp (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2378.25	45.6	H	peak	0.3	45.9	74.0	28.1
2378.25	36.0	H	average	0.3	36.3	54.0	17.7
2390.00	46.2	H	peak	0.4	46.6	74.0	27.4
2390.00	35.4	H	average	0.4	35.8	54.0	18.2
2483.50	67.5	H	peak	0.8	68.3	74.0	5.7
2483.50	64.2	H	average	0.8	***44.4	54.0	11.5

Note:

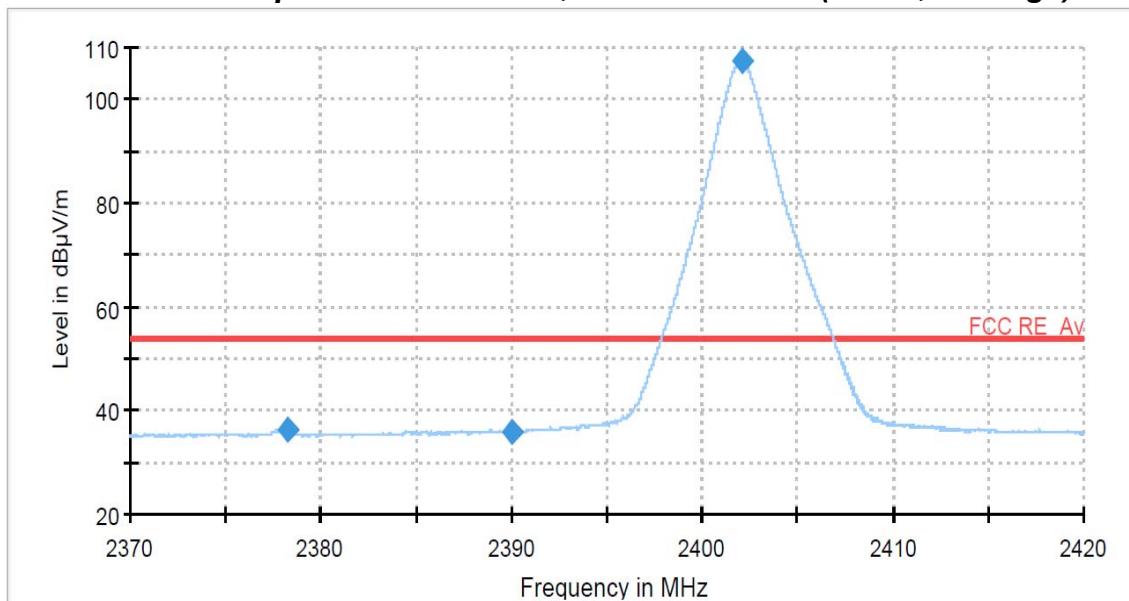
- *Pol. H = Horizontal V = Vertical
- **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
- Other spurious was under 20 dB below Fundamental.
- *** Duty Cycle Correction Factor Calculation (Worst case : AFH mode)
 - Channel hop rate = 800 hops/second
 - Adjusted channel hop rate for DH5 mode = 133.33 hops/second
 - Time per channel hop = 1/133.33 hops/second = 7.50 ms
 - Time to cycle through all channels = 7.50 x 20 channels = 150 ms
 - Number of times transmitter hits on one channel = 100 ms / 150 ms = 1 time(s)
 - Worst case dwell time = 7.50 ms
 - Duty cycle correction factor = $20\log_{10}(7.50\text{ms}/100\text{ms}) = -22.5 \text{ dB}$
- GFSK modulation mode was the worst condition.
- The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.
- Peak emissions were measured using RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.
- Average emissions were measured using RBW = 1 MHz, VBW = 1kHz, Detector = Peak

PLOT OF TEST DATA

Restricted Band Spurious Emissions, Lowest channel(GFSK, Peak)

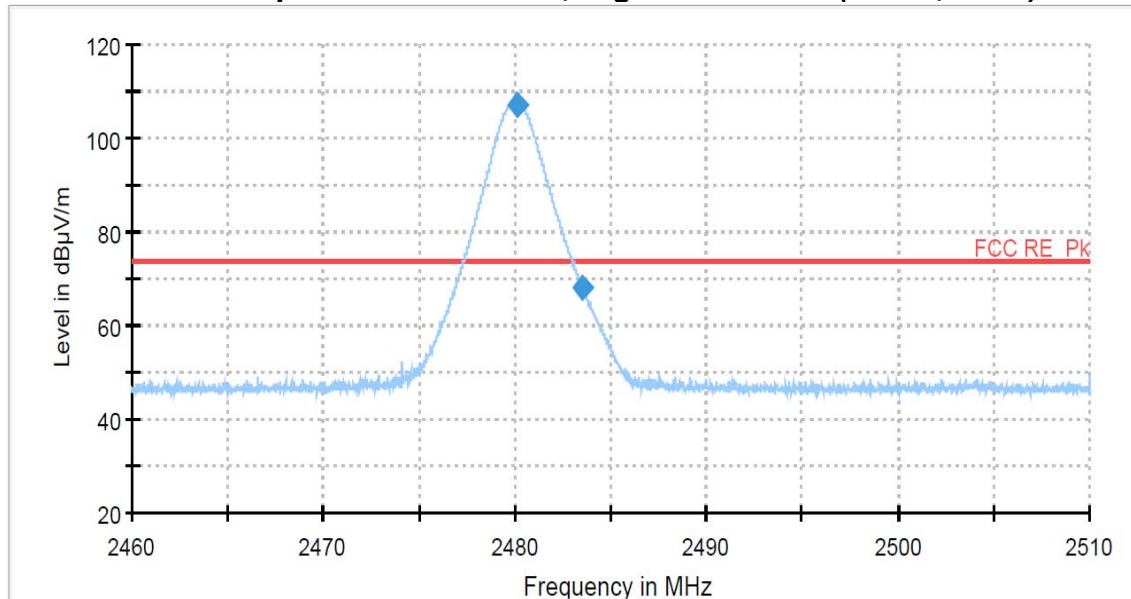


Restricted Band Spurious Emissions, Lowest channel(GFSK, Average)

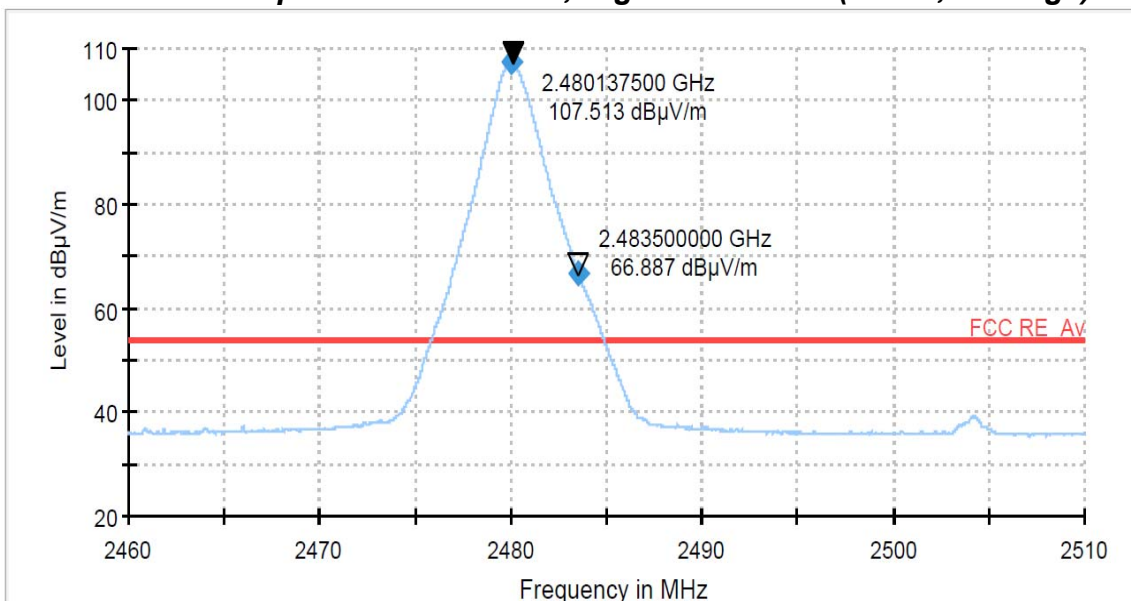


PLOT OF TEST DATA

Restricted Band Spurious Emissions, Highest channel (GFSK, Peak)



Restricted Band Spurious Emissions, Highest channel (GFSK, Average)***



9. TEST EQUIPMENT

No.	Instrument	Manufacturer	Model	Serial No.	Calibration Date	Calibration Interval
1	*Test Receiver	R & S	ESU 40	100202	Apr. 04 2016	1 year
2	*Test Receiver	R & S	ESCS30	100302	Oct. 06 2015	1 year
3	*Attenuator	PASTERNAK	PE7395-10	1441	Jan. 19 2016	1 year
4	*Attenuator	FAIRVIEW	SA3N5W-06	N/A	Apr. 04 2016	1 year
5	*Attenuator	FAIRVIEW	SA3N5W-10	N/A	Apr. 04 2016	1 year
6	Attenuator	WEINSCHL	56-10	58765	Oct. 02 2015	1 year
7	*Amplifier	R & S	SCU 01	10030	Apr. 04 2016	1 year
8	*Amplifier	R & S	SCU18	10065	Apr. 04 2016	1 year
9	*Amplifier	R & S	SCU26	10011	Jul. 17 2015	1 year
10	Amplifier	R & S	SCU40	10008	Aug. 10 2015	1 year
11	*Pre Amplifier	HP	8449B	3008A00107	Jan. 07 2016	1 year
12	Spectrum Analyzer	R & S	FSW43	100732	Apr. 05 2016	1 year
13	*Spectrum Analyzer	Agilent	N9020A	MY51110087	Oct. 15 2015	1 year
14	*Spectrum Analyzer	R&S	FSP40	100361	Jul. 16 2015	1 year
15	DC Power Supply	HP	6574A	US36340190	Jul. 17 2015	1 year
16	*Loop Antenna	R & S	HFH2-Z2	100279	Feb. 22 2016	2 year
17	Wideband Power Sensor	R & S	NRP-Z81	100634	Jul. 17 2015	1 year
18	*Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-474	Sep. 01 2014	2 year
19	*Horn Antenna	Q-par Angus	QSH20S20	8179	Apr. 30 2015	2 year
20	Horn Antenna	Q-par Angus	QSH22K20	8180	Apr. 30 2015	2 year
21	*Trilog-Broadband Antenna	SCHWARZBECK	VULB 9163	9163-423	Nov. 04 2015	2 year
22	LISN	R & S	ESH3-Z5	833874/006	Oct. 06 2015	1 year
23	*Controller	INNCO	CO2000-G	CO2000/562/23890210/L	N/A	N/A
24	*Turn Table	INNCO	DT3000-3T	N/A	N/A	N/A
25	*Antenna Mast	INNCO	MA4000-EP	N/A	N/A	N/A
26	*Open Switch And Control Unit	R & S	OSP-120	100015	N/A	N/A
27	*Anechoic Chamber	Seo-Young EMC	N/A	N/A	N/A	N/A
28	*Position Controller	INNCO	CO2000	12480406/L	N/A	N/A
29	*Turn Table	INNCO	DS1200S	N/A	N/A	N/A
30	*Antenna Mast	INNCO	MA4000	N/A	N/A	N/A
31	*Anechoic Chamber	Seo-Young EMC	N/A	N/A	N/A	N/A
32	Shielded Room	Seo-Young EMC	N/A	N/A	N/A	N/A
33	*Open Switch And Control Unit	R & S	OSP-120	100081	N/A	N/A

*) Test equipment used during the test

10. ACCURACY OF MEASUREMENT

The Measurement Uncertainties stated were calculated in accordance with the requirements of measurement uncertainty contained in CISPR 16-4-2 with the confidence level of 95%

1. Conducted Uncertainty Calculation

Source of Uncertainty	X_i	Uncertainty of X_i		Coverage factor k	$u(X_i)$ (dB)	C_i	$C_i u(X_i)$ (dB)
		Value (dB)	Probability Distribution				
Receiver reading	RI	± 0.1	normal 1	1.000	0.1	1	0.1
Attenuation AMN-Receiver	LC	± 0.08	normal 2	2.000	0.04	1	0.04
AMN Voltage division factor	LAMN	± 0.8	normal 2	2.000	0.4	1	0.4
Sine wave voltage	dVSW	± 2.00	normal 2	2.000	1.00	1	1.00
Pulse amplitude response	dVPA	± 1.50	rectangular	1.732	0.87	1	0.87
Pulse repetition rate response	dVPR	± 1.50	rectangular	1.732	0.87	1	0.87
Noise floor proximity	dVNF	± 0.00	-	-	0.00	1	0.00
AMN Impedance	dZ	± 1.80	triangular	2.449	0.73	1	0.73
Ⓐ Mismatch	M	+ 0.70	U-Shaped	1.414	0.49	1	0.49
Ⓑ Mismatch	M	- 0.80	U-Shaped	1.414	- 0.56	1	- 0.56
Measurement System Repeatability	RS	0.05	normal 1	1.000	0.05	1	0.05
Remark	Ⓐ: AMN-Receiver Mismatch : + Ⓑ: AMN-Receiver Mismatch : -						
Combined Standard Uncertainty	Normal			± 1.88			
Expanded Uncertainty U	Normal ($k = 2$)			± 3.76			

2. Radiation Uncertainty Calculation

Source of Uncertainty	X_i	Uncertainty of X_i		Coverage factor k	$u(X_i)$ (dB)	C_i	$C_i u(X_i)$ (dB)
		Value (dB)	Probability Distribution				
Measurement System Repeatability	RI	0.34	normal 1	1.00	0.34	1	0.34
Receiver reading	dVsw	± 0.02	normal 2	2.00	0.01	1	0.01
Sine wave voltage	dVpa	± 0.17	normal 2	2.00	0.09	1	0.09
Pulse amplitude response	dVpr	± 0.92	normal 2	2.00	0.46	1	0.46
Pulse repetition rate response	dVnf	± 0.35	normal 2	2.00	0.18	1	0.18
Noise floor proximity	AF	± 0.50	normal 2	2.00	0.25	1	0.25
Antenna Factor Calibration	CL	± 2.00	rectangular	$\sqrt{3}$	1.15	1	1.15
Cable Loss	AD	± 1.00	normal 2	2.00	0.50	1	0.50
Antenna Directivity	AH	± 0.00	rectangular	$\sqrt{3}$	0.00	1	0.00
Antenna Factor Height Dependence	AP	± 2.00	rectangular	$\sqrt{3}$	1.15	1	1.15
Antenna Phase Centre Variation	AI	± 0.20	rectangular	$\sqrt{3}$	0.12	1	0.12
Antenna Factor Frequency Interpolation	SI	± 0.25	rectangular	$\sqrt{3}$	0.14	1	0.14
Site Imperfections	DV	± 4.00	triangular	$\sqrt{6}$	1.63	1	1.63
Measurement Distance Variation	Dbal	± 0.60	rectangular	$\sqrt{3}$	0.35	1	0.35
Antenna Balance	DCross	± 0.90	rectangular	$\sqrt{3}$	0.52	1	0.52
Cross Polarisation	M	± 0.00	rectangular	$\sqrt{3}$	0.00	1	0.18
Mismatch	M	+ 0.98 - 1.11	U-Shaped	$\sqrt{2}$	0.74	1	0.74
EUT Volume Diameter	M	0.33	normal 1	1.00	0.33	1	0.11
Remark							
Combined Standard Uncertainty	Normal						
Expanded Uncertainty U	Normal ($k = 2$)						